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HOW FAR MAY A COW BE TUBERCULOUS BEFORE HER MILK BECOMES DANGEROUS AS AN ARTICLE OF FOOD?[1]

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The change of opinion in regard to the infectious nature of tuberculosis has been very marked in the last few years, not among the scientists, but among the people at large. Of course the medical world has, as a rule, accepted the conclusions to be drawn from Villemin's work of twenty-five years ago, and the discovery of the specific cause of the disease by Koch has only added strength to the theories advanced in certain quarters before that time.

The change of opinion spoken of is, after all, hardly a change, but, more properly, an acceptance of the knowledge gained in regard to the disease by the more recent and exact methods of research, and a much wider diffusion of that knowledge. More and more is it the rule that the knowledge of the transmissibility of tuberculosis by means of infected material is recognized among those whom it concerns the most, and nothing but good can come from the diffusion of that knowledge.

It is hardly too much to say that proper methods of management of tuberculosis, both in human beings and in animals, involve more important interests—pecuniary as well as vital—than any other subject that engages the attention of medical men. It is well known that one-seventh of the human race, approximately, perish from this disease, and when we acknowledge to ourselves, as a fair review of the evidence at

[1] Read before the Association of American Physicians, Washington, Sept. 20, 1889.

hand must force us to do, that most, if not all, of this loss is preventable, our duty is plain before us. That is, never to cease speaking of it, never to give up trying to reconcile the money interests of man with his own welfare, and to do all in our power, by the collection of clinical and experimental evidence, to make the case complete.

The work showing the etiological relationship of the bacillus of tuberculosis to the disease was, to all intents and purposes, complete upon the publication of Koch's monograph upon the subject. Nothing more in the way of proof was actually needed, and, indeed, very little has been furnished. At the same time, confirmatory evidence was demanded by some who had and many who had not access to the original details, and this confirmatory evidence has been furnished in such overwhelming amount that it is to-day but a waste of time to repeat, what is accepted the scientific world over, that in the organism described by Koch we have the specific cause of this pathological change, and that without its activity we do not have tuberculosis in any form or under any conditions.

An imperfect understanding of the nature of bacteria in general, and of this organism in particular, has led to many attempts to arrest the pulmonary form of the disease it produces, by therapeutic measures, most of which would have been seen to be useless at the outset, if a knowledge of the problem had been complete. It is not upon drugs or mechanical means that our reliance should be placed in attempting to stamp out this scourge of civilized man. Our attention must be turned in the direction of proper preventive measures, and until the necessity for this is impressed upon physicians in general, and by them upon the people at large, so that the preventive measures suggested after mature deliberation will be complied with, but little can be effected, and the knowledge gathered after so much hard labor must be considered as wasted, for the time being.

In order to the suggestions upon which the stamping out of tuberculosis must depend, there is necessary a large amount of investigation into the methods by which it spreads and by which the virus is carried from person to person. Among these methods are undoubtedly the excreta—more especially the sputum—from persons affected with the disease; the excreta are carelessly treated and scattered broadcast to the injury of persons susceptible but not previously affected. The methods of distribution in this way, and the behaviour of the bacillus of tuberculosis outside of the body, have been well and recently treated by Cornet (*Zeit. f. Hyg.*, Bd. v. S. 191, 1888).

Other methods of distribution are of importance, however, and until within a few years have not received attention from the medical profession at all commensurate with their value. These methods of infection are those arising from the ingestion of food materials coming from the domestic animals, especially the flesh and milk of cattle.

In Koch's *Etiology of Tuberculosis* he uses the following expressions:

"Since by far the greatest number of cases of tuberculosis begin in the lungs, it is to be supposed that the infection in all these cases has taken place in the manner just suggested—by the inhalation of phthisic sputum dried and made into dust. The second principal source for the tubercle-bacilli, viz., tuberculosis of the domestic animals, appears not to have anything like the importance of the phthisic sputum. The animals, as is well known, produce no sputum, so that during their life no tubercle-bacilli get from them into the outer world by means of the respiratory passages. Also in the excrement of tuberculous animals the bacilli appear to be only exceptionally present. On the contrary, it is a fact that the milk of tuberculous animals can cause infection.

"With the exception of this one way, therefore (*i. e.*, through milk), the tuberculous virus can only have effect after the death of the animal, and can only cause infection by the eating of the meat. The same conditions hold for the milk of cows suffering from 'perlsucht.' Before all things, if infection is to take place, it is necessary that the milk contain tubercle-bacilli; but this appears to be the case only when the milk-glands themselves are affected with the disease. This explains at once the contradictions in the statements of various authors, who have made feeding experiments with the milk from cows suffering from 'perlsucht.' If infection from tuberculous animals does not appear to be frequent, it must by no means be underrated."

This caution is one which was necessary at the time it was written, and its repetition is as necessary now as ever. What conclusions may be reached in regard to its *extreme* importance, are well shown by the statistics collected and presented by Dr. Brush before the New York Academy of Medicine, on April 29, 1889 (*Boston Med. and Surg. Journal*, cxx. p. 467 *et seq.*). In this paper the author states that after several years of close study of the affection, including a consideration of all accessible statistics, and the habits of the people among whom it prevails, he has arrived at the conclusion that the only constantly associated factor is found in the in-bred bovine species. If a community was closely connected with in-bred dairy cattle, tuberculosis prevailed, and, *vice versâ*, if there were no in-bred dairy cattle there was no tuberculosis. In the discussion following this paper many objections were raised. Dr. Brush went on to say that he believed that the disease was originally derived from the bovine species. He did not believe that less than fifty per cent of all dairy cattle were affected with it, while the statistics he had quoted showed that wherever there was a race of people without cattle phthisis was unknown. He believed, furthermore, that if all the cattle in this country were to be killed, the disease would finally die out entirely here.

Such statements as these are a revelation to the generality of practitioners, and may seem to be somewhat forced, but they certainly indicate, together with the statistics upon which they are based, the existence of a greater danger than has been fairly realized. That the danger from the consumption of milk coming from cows affected with tuberculosis has been understood by individuals at least, and that, too, before the announcement of Koch's discovery, is very well shown by extracts from

a letter which I take the liberty of quoting here. The gentleman writing it is a veterinarian in practice in Providence, R. I., and the observations were made and the advice given more than ten years ago. That portion of his letter bearing upon the subject in hand is as follows:

"Mr. W., June 15, 1878, called me to see a white and red cow. Coughs and is short of breath and wheezes. Pulse 60; respiration 14, and heavy at the flanks; temperature 104°. Diminished resonance of right lung, but increased in part of the same. Emphysematous crackling over left lung and dulness on percussion. Diagnosed a case of tuberculosis and advised the destruction of the animal.

"*Dec.* 12. Cow in a cold rain a few days ago for about two hours. Milk still more diminished than at a visit made on September 25th. Again advised the destruction of the cow. Family still using the milk. Respiration 20; pulse 85; temperature 104.6°.

"*Feb.* 22, 1879. Temperature 104.8°; respiration 26; pulse 68. Losing flesh fast. Milk still in small quantities. Advised, as before, to destroy the animal and *not to use milk.*

"*May* 30. Called in a hurry to see cow. Is now as poor as could be. No milk for a week. Pulse 80; respiration 40; temperature 106°. The cow died in about three hours. Autopsy made fourteen hours after death: Lungs infiltrated with tuberculous deposit. Weight of thoracic viscera 43.5 pounds. Tuberculous deposits found in the mediastinum, in the muscular tissues, and in the mesentery, spleen, kidneys, udder, intestines, pleura, and one deposit on the tongue. The inside of the trachea was covered with small tubercles.

"In August, 1879, the baby was taken sick, and died in about seven weeks. On post-mortem of the child there was found meningeal tuberculosis—deposits all over the coverings of the brain and some in the lung.

"In 1881 a child, about three years old, died with, as it was called, tuberculous bronchitis. And in 1886, a boy, nine years old, who for three or four years had been delicate, died with consumption—'quick,' as it was called.

"So far as known, the family on both sides have never before had any trouble of the kind, and the parents were both rugged and healthy people, and so were the grandparents—one now being alive and sixty-eight years old, and the other dead at seventy-eight."

Of course there is much room for criticism, if these cases be quoted as carrying out an exact clinical experiment, and no one can say that the occurrence of the three deaths in the same family was anything more than a coincidence. At the same time it must be acknowledged that they offer very solid suggestions for consideration, and that the light thrown upon the disease by the investigations of recent years make the advice of the veterinarian to "kill the cow and stop using the milk" much more sound than it appeared to the minds of the medical gentlemen who "laughed" at him at the time it was given.

It is my hope within the coming year to collect a series of clinical observations which will be of interest and some service in elucidating the question of how many cases of tuberculosis occur which produce suspicion in the minds of medical or veterinary attendants of having an origin in the milk from infectious cows.

It is upon this question of possible danger from the domestic animals

—especially cattle—that much recent work has been done, but the subject has been by no means exhausted.

If there is danger to human beings from the widespread existence of tuberculosis among cattle, some sort of restrictive measures must be taken, by means of which this danger can be lessened. At the same time legislation calling for so much pecuniary loss as would be the case if the present supply of tuberculous cattle were to be destroyed, can only be asked for with a backing of as much carefully gathered scientific evidence as can be obtained, and it is the part of preventive medicine and the experimental method to furnish some of this evidence.

Through the liberality and broad-mindedness of an association of gentlemen in Boston, it is possible to present the results of certain experiments undertaken to determine the question which is expressed in the title of this paper. "How far may a cow be tuberculous before her milk becomes dangerous as an article of food?" is an extremely important point to decide. If it be considered already settled and Koch's dictum be accepted, that there is no danger in the milk, if the mammary glands be not affected, then there remains only for the veterinary surgeon to determine the existence of such lesions, and restrictive measures can go no further. If, however, the milk from cows with no visible lesion of the lacteal tract be shown to contain the specific virus of the disease in a not inconsiderable number of cases, and if this milk be shown to possess the power of producing the tuberculous process upon inoculation in small quantities and in feeding experiments carried out with every possible precaution, then restrictive measures must have a far wider scope, and be carried on from an entirely different standpoint than has heretofore been considered necessary.

It is familiar to most of us that little importance has been attached to this question—the danger of milk from tuberculous cows with no lesions of the udder—for the reason that many experiments have been made with negative results, and because *à priori* reasoning would seem to indicate the absence of such danger; because tuberculosis is not a disease like anthrax, in which the specific poison is to be found in all parts of the system and is carried from one place to another by the blood-stream. Koch's assertion that the milk from cows affected with tuberculosis is dangerous only when the udder is involved, appears to be based upon theoretical considerations rather than practical work in this especial direction. It has been widely accepted, however, and the weight of his name has caused the assertion to be repeated many times with but few attempts to verify its correctness.

The increased attention that has been paid to the disease among cattle, and the suspicions that have been aroused that tuberculosis among the domestic animals is a more frequent cause of its appearance among men than has been supposed, have made a careful investigation

of this point imperatively necessary. With the exception of a few successful experiments by Bollinger (*Deutsch. Zeit. f. Thiermed.*, Bd. xiv. S. 264) and Bang (*Ibid.*, Bd. 11, S. 45, 1885), no evidence of great value is to be adduced. These authors, as well as Tschokke (quoted by Bollinger), bring out isolated cases showing successful inoculation experiments with the milk from tuberculous cows with no disease of the udders, but the experiments are so few in number that they cannot be accepted as furnishing more than a probability, and extremely critical persons might be justified in ascribing the results to contamination.

Bang (*Congrès pour l'étude de la Tuberculose*, 1, p. 70, 1888) gives new results. Examining twenty-one cases of cows affected with general tuberculosis but with no signs of disease in the udder, he found but two whose milk showed virulent qualities upon inoculation in rabbits. He concludes that since the cows experimented with were in advanced stages of the disease and yet showed such slight virulent properties in their milk, the danger from cows in less advanced stages is much less. And this conclusion he thinks is borne out by experiments with milk drawn from eight women affected with tuberculosis; specimens were used from all for inoculation and none were found to be virulent. He draws the conclusion, therefore, that it is not necessary to consider all milk dangerous coming from tuberculous cows, but that it should always be *suspected*, because no one can say when the udder will be diseased, and because, without this, the milk from tuberculous cows contains the virus in rare cases.

I shall endeavor to show that it is not at all rare for such milk to contain the virus.

Galtier also (*loc. cit.*, p. 81) has given the result of certain experiments with milk coming from tuberculous cows, but he says that

"certain experimenters claim to have established the virulence of milk coming from animals whose udders appeared to be normal and free from any lesions; the greater number, and I am one of them, have merely encountered a virulence in milk after the udder had become tuberculous. However, as a beginning tuberculosis of the udder is an extremely difficult thing to recognize, especially during the life of the animal, the milk should be considered dangerous which comes from any animal affected, or suspected of being affected, with tuberculosis."

I shall endeavor to show that this view of the case is justified by something more than probabilities.

In the *Deutsch. Arch. für klin. Med.*, Bd. xliv. S. 500, Hirschberger reports the results of an experimental research upon the infectiousness of the milk of tuberculous cows, in which—following out Bollinger's work—he attempts to settle, 1st, whether the cases are rare in which tuberculous cows give an infectious milk; and 2d, whether the milk is infectious only in cows with general tuberculosis, or whether it is also infectious when the disease is localized. He made the trials of the in-

fected milk by injection into the abdominal cavity of guinea-pigs with the usual precautions. His results were as follows:

1. Milk was used five times from cows affected with a very high degree of general tuberculosis in all the organs.

2. Milk was used six times from cows with only a moderate degree of disease.

3. Milk was used nine times from cows in which the disease was localized in the lung.

From these twenty cases the milk was proven to be infectious in eleven. The percentage of positive results in the animals when arranged in accordance with the three groups above given was 80 per cent. in the first group (milk from cows in a very advanced stage of the disease), 66 per cent. in the second group, and 33 per cent. in the third. He found the bacilli in only one of the specimens of the milk, and considers that this, therefore, shows that the inoculation experiments are the more certain guide as to whether the milk is infectious or not.

These results are extremely interesting, although they do not lay as much stress as do mine upon the presence or absence of lesions of the lacteal tract.

The experiments which I am able to report[1] have been made possible by the liberality of the Massachusetts Society for the Promotion of Agriculture, which became interested in the question some time ago, and has put it in my power to carry them on. They have given everything in the way of pecuniary and moral support that the work has required; my own part has been that of general director, and I have had associated with me during the whole time the Society's veterinarian, Austin Peters, D. V. S. For the last year I have also had the very valuable aid of Dr. Henry Jackson and Langdon Frothingham, M. D. V.

All of the inoculation experiments and most of the microscopic work have been done in the bacteriological laboratory of the Harvard Medical School, some of the microscopic work at the Society's laboratory in Boston, whilst the feeding experiments have been done and the experimental animals have been kept at a farm in the country devoted to this especial purpose, and situated among the healthiest possible surroundings. Nothing has been set down as the result of microscopic observation that I have not myself verified, and every portion of the work has been carried out under the most exacting conditions and with every possible precaution against contamination.

Before the farm buildings were used at all they were thoroughly cleaned from top to bottom. Every portion of old manure was carted away, as well as all the old earth. The whole of the woodwork was

[1] The full notes of these experiments will be found in the Transactions of the Association of American Physicians, vol. iv., 1889.

scrubbed and then washed with corrosive sublimate solution (1 : 1000) and finally whitewashed, and every care was taken to secure good drainage and free ventilation. The result and effectiveness of all this have been best demonstrated by the fact that every animal brought to the place made a most marked improvement in its general condition, while some of them even went so far as to appear to get well.

In deciding whether the milk from any cow affected with tuberculosis is dangerous, when the udder shows no lesion, the first point is to see whether the milk contains the infectious principle or not. In this case, of course, that infectious principle is the bacillus of tuberculosis, and attention was turned to that for some time. The observations have been carried on over a long space of time, and were made as follows: The milk was taken from the cow in the morning—or evening, as the case might be—the udders and teats having just been thoroughly cleansed. The receptacle was an Erlenmeyer flask, stoppered with cotton-wool and thoroughly sterilized by heat. The specimen was taken at once to the laboratory, there placed in conical glasses, with ground-glass covers—the whole of these having been carefully cleansed beforehand—and then allowed to stand in a clean refrigerator for twenty-four to forty-eight hours, and sometimes for seventy-two hours.

At the end of that time from ten to twenty cover-glass preparations were made from various parts of the milk or cream. These were stained after Ehrlich's twenty-four hour method, with fuchsin and methylene blue as a contrast color, and then searched with an immersion lens.

We prepared for examination in the way spoken of above, one hundred and seventeen sets of cover-glasses from as many different samples of milk. Of these specimens three spoiled, *i. e.*, turned sour or acid before the examination was completed, and must be rejected, leaving, therefore, one hundred and fourteen samples of milk of which the examination was completed. These samples were obtained from thirty-six different cows, all of them presenting more or less distinct signs of tuberculosis of the lungs or elsewhere, but none of them having marked signs of disease of the udder of any kind.

Of these samples of milk there were found *seventeen* in which the bacilli of tuberculosis were distinctly present; that is to say, the *actual virus was seen in* 31.5 per cent. of the samples examined (36 : 114 =31.5). These seventeen samples of infectious milk came from ten different cows, showing a percentage of *detected* infectiousness of 27.7 per cent. (10 : 36=27.7). These results are exceedingly interesting, it seems to me, and I confess I am surprised at the size of the percentage named. Not because I had not expected to find the bacilli—I have been convinced for several years that persistent search would show their presence in such cases as those that are here recorded—but because the amount of dilution to which the organisms must be subjected dimin-

ished immensely the chance of their being found at all. In no case have they been seen in large numbers, but equally in no case has a diagnosis been made where there was the slightest doubt of the appearances under the microscope.

The large number of cases in which these organisms have been found seem to me to indicate their presence in a still greater proportion of cases, if only a sufficiently thorough examination of all the milk could be made. This of course is out of the question, but the results here given seem to establish, beyond a doubt, the fact that milk coming from cows with no definite lesion of the udder may contain the infectious principle of tuberculosis, if the disease be present in other portions of the body of the animal. Also, that this presence of the infectious principle is not merely a scientific *possibility* but an actual *probability*, which we should be thoroughly aware of and alive to.

Other interesting facts shown are these: that the cream after rising is quite as likely to be infectious as the milk, because the bacilli were found in the milk nine times after the cream had risen, and in the cream eight times after it had separated from the milk.

In regard to the constancy of the occurrence of the bacilli in the milk, in two of the ten cows in whose milk the bacilli were found, but one sample of the milk was examined; and the bacilli were found in one sample out of several examined at different times, in two cases. In the remaining six cows, bacilli were found two or more times in different samples of the milk. So that, as far as they go, these results seem to indicate that the bacilli are present with a fair degree of constancy. At the same time it should not be surprising if one examination was successful and others failed, because of the chances against success, owing to dilution, which were spoken of above.

In nine of the seventeen cases the time of the milking and the portion of the milk used were noted; that is to say, a sample was taken from the first of the milking, or the last of the milking, and then cover-glasses made from the milk or cream. In these cases bacilli were found in the cream three times, and in the milk four times, from the first of the milking; in samples from the last of the milking, in the cream no times, and in the milk four times; and this too seems to show an interesting point, viz., that the bacilli, if present at all in the udder, are not washed out entirely by the first manipulations of the teats, but may be supposedly present in any portion of the milk. The converse is also indicated, that the manipulation of the udder in the process of milking does not express the bacilli from the tissue into the latter portion of the milk, but that, as before, they may be supposed to be pretty evenly distributed in all parts of the udder if they be present at all.

Before going on to consider the results of the inoculation experiments made with various specimens of milk, it may be well to glance at the

condition of the cows that have been under our control from the time of the beginning of the experiments until they were killed, or until the date of preparing this paper.

The history of each cow, as far as we have been able to secure it, bears out our assertion—as far as the examinations have gone, that none of the udders were affected with tuberculosis—certainly so far as gross appearances were concerned. This was true, also, in the microscopic appearance of every case but one (No. 6, cow F). In this case the gross appearances in the udder were healthy, except that one quarter seemed to be slightly fibrous, and there were one or two yellow spots which were seen to be made up of fat under the microscope. With a low power lens only a slight increase of fibrous tissue was observable, and the oil-immersion was put on merely as a matter of routine. One giant cell was discovered containing a number of bacilli, but a careful search failed to show any others, or any signs of change, except the increase of fibrous tissue noted above. So that the assertion is still true, that we have failed to discover any signs of tuberculosis that were easily recognizable in any of the cows here recorded, and these include all we have had under closer observation.

Those from which milk was used for inoculations that are not here given had no signs that permitted of even a probable diagnosis by skilled veterinarians.

We also made an interesting series of experimental inoculations in rabbits and guinea-pigs with milk or cream from various cows, in varying quantities and at different times. Of rabbits there were used fifty-seven animals. Of these, five were inoculated with milk which had turned sour, two died of intercurrent diseases in a few days (coccidium oviforme), and of one the material was lost before the microscopic examination was completed—so that eight animals are to be rejected, leaving forty-nine upon which the results can be based. Out of these, five were made more or less tuberculous, as proven by microscopic examination, and in forty-four the results were negative—that is to say, we obtained 5 : 49, or 10.2 per cent. of successes out of all inoculations in rabbits.

There were used thirty three different specimens from thirteen different cows—that is, there were 23 per cent. (3 : 13) successful results from the cows used, and 15.15 per cent. (5 : 33) successful results from the specimens used.

Positive results were obtained from

Cow P twice (at different times).

Cow L once.

Saunders cow twice (at different times).

The results of the inoculations of guinea-pigs are more striking. There were sixty-five animals used in all. Of these, nine were inoculated with sour milk or cream, and two died in a day or two of other diseases (peri-

tonitis and pleurisy). There are, therefore, but fifty-four that should be counted. In them, there were twelve positive results, or 28.57 per cent. (12 : 42) successes out of all the inoculations. There were used thirty-two specimens from fourteen different cows, and the successful results came from six different cows—that is, 42.8 per cent. (6 : 14) of the cows were shown in this way to have infectious milk, and 37.5 per cent. (12 : 32) of the specimens used were shown to have active infectious properties.

Positive results were obtained from

Cow P (three times in two different inoculations).
Cow D (three times in three different inoculations).
Cow F (once).
Slocum cow (once).
Saunders cow (once).
Mayhew cow (three times in two different inoculations).

The combining of the results obtained from both rabbits and guinea-pigs shows the following: Successful results were obtained in milk from cow P three times (two different specimens) in guinea-pigs, and twice in rabbits (two different specimens); from cow L once in rabbits; from cow O three times (three different specimens) in guinea-pigs; from cow F once in guinea-pigs; from the Slocum cow once in guinea-pigs; from the Saunders cow once in guinea-pigs, and twice in rabbits (two different specimens); and from the Mayhew cow three times in guinea-pigs (two different specimens)—that is to say, out of fourteen cows used the milk was shown to be infectious in seven, or 50 per cent., by inoculation experiments.

An interesting fact is also shown, and that is, that bacilli were found in the milk or cream, and successful inoculation experiments made in animals with the same specimen in five different cases (including eight of the successful ones) as follows:

Comparison of the dates when Bacilli were found in the Milk and the same Milk was used for successful inoculation experiments.

Cow.	*Positive.* Cover-glass.	*Positive.* Guinea-pig.	*Positive.* Rabbit.
P.	Cream, A. M.	Cream, A. M., March 9, 1889	Cream, A. M., March 9, 1889
	Cream, P. M.	Cream, P. M., March 9, 1889 Cream, P. M., March 9, 1889	Cream, P. M., March 9, 1889
O.	First of milking, cream, March 9, 1889.	First of milking, cream, March 9, 1889	
Slocum.	Last of milking.	Last of milking, June 10, 1889	
Mayhew.	Last of milking, milk.	Last of milking, milk, June 21, 1889	

The inoculation experiments, above detailed, seem to me to be deserving of consideration because they were done under the most careful precautions that could be devised. In all cases the experiment animals were kept under observation long enough to determine, so far as could

be seen, that they were in good health, and after the inoculations they were separated and kept under close watch, but in healthy surroundings. Some of those that were used were inoculated immediately after purchase, because of a scarcity of the supply at the farm, and were not in good condition. But as no sign of tuberculosis appeared in any of these, their ill health cannot come in as a disturbing factor in the results.

The results obtained from certain feeeding experiments with calves show that there were thirteen calves used, and fed for varying lengths of time with milk from cows affected with tuberculosis, but not of the udder. Of these, the material was thrown away from one before the microscopic examination, and this should be rejected in the final results. Of the remainder there were five positive results obtained and one suspicious. The latter is counted as negative, for the reason that, although giant cells and granulation tissue were seen, no bacilli were found. There were, therefore, five out of twelve positive results, or 41.66 per cent. It should also be said that of those counted as negative three sets of specimens were suspicious, but were hastily examined for the purposes of this paper, so that a more careful search may very probably increase the percentage of successes.

In the series of feeding experiments on one set of pigs, the milk being given to them from the same cows as before, there were seven pigs used in all, from one litter and healthy parents. Of these, examination showed negative results in two, positive results in two, one was subjected to a very hasty microscopic examination, and the material from two was thrown away—a mistake, as was shown by the results of the microscopic examination of the material from No. 3. There are to be counted, therefore, only five, giving as successful results 40 per cent.

By the cover-glass examinations we have shown that the milk contains infectious material in ten cows out of thirty-five from which the milk was examined for bacilli—that is, in 28.57 per cent. We have also shown that the milk was infectious, by inoculation experiments, in seven out of fourteen of the cows from which the milk came—that is, 50 per cent. And we have shown the infectious nature of the milk by ocular demonstration and successful inoculation from the same specimens in five cows out of fourteen used—or, 35.7 per cent.

These results are, to a certain extent, preliminary—that is to say, they are but part of the work upon this subject which is being done under the auspices of the Massachusetts Society for the Promotion of Agriculture. The work will not be completed, at any rate, until next year.

They show, however:

1st, and emphatically, that the milk from cows affected with tuberculosis in any part of the body may contain the virus of the disease.

2d. That the virus is present whether there is disease of the udder or not.

3d. That there is no ground for the assertion that there must be a lesion of the udder before the milk can contain the infection of tuberculosis.

4th. That, on the contrary, the bacilli of tuberculosis are present and active in a very large proportion of cases in the milk of cows affected with tuberculosis but with no discoverable lesion of the udder.

THE TREATMENT OF PHTHISIS PULMONALIS WITH SMALL DOSES OF MERCURY BICHLORIDE COMBINED WITH POTASSIUM IODIDE.

By John R. Hall, M.D.,
of Marshall, Missouri.

In The American Journal of the Medical Sciences for January, 1876, may be found an article from the pen of Prof. Edward L. Keyes, of New York, giving the results of his experiments showing the effect of small doses of mercury in modifying the number of red blood-corpuscles in syphilis. In these experiments the hæmatimeter of Hayem and Nachet was used, and "every possible source of error eliminated."

As the result of these experiments, Prof. Keyes deduced the following conclusions:

First. Five million red blood-corpuscles in the cubic millimetre, is a full high average for the adult healthy male; fine conditions of physical health reach above six millions.

Second. Mercury decreases the number of red blood-corpuscles when given in excess.

Third. Syphilis diminishes the number of red blood-corpuscles below the healthy standard.

Fourth. Mercury in small doses, continued for a short or long period in syphilis, alone or with the iodide of potassium, increases the number of red corpuscles in the blood and maintains a high standard of the same.

Fifth. Mercury in small doses acts as a tonic on healthy animals, increasing their weight. In large doses it is debilitating or fatal.

Sixth. Mercury in small doses is a tonic for a time at least, to individuals in fair health, not syphilitic. In such individuals it increases the number of red blood-corpuscles.

These conclusions deeply impressed me at the time of their publication. I often reasoned upon the probable value of this drug in other forms of disease characterized by cachexia, emaciation, diminution, or destruction of red corpuscles, fibrous infiltrations, etc. About eight years after reading Prof. Keyes' article I first administered small doses of bichloride of mercury with potassium iodide to patients suffering from

phthisis, with a result which, compared with former experience in such cases, was no less surprising than gratifying. During the succeeding years I have witnessed a repetition of its action sufficiently often to convince me of its great value in treating this formidable disease, which annually destroys so many of the lives of human beings and of the lower animals.

The following cases represent a part of my experience only. Their histories are necessarily incomplete, scattered as they are over several years, no records of the cases being kept. A few dates from my ledger are the only recorded facts, and even these are in some instances absent, the poverty of the patients forbidding a charge. The important facts involved are not the less valuable because of these imperfections. The following conditions were present (in different degrees of course) in all the patients, viz.: A frequent pulse, elevated temperature, a wasted or wasting body, loss of appetite, cough, often accompanied by bloody expectoration, pulmonary dulness on percussion, increased vocal resonance, prolonged expiratory murmur, moist râles, etc.; in short, those factors were present the *tout ensemble* of which constitutes consumption. The mercury was given in doses ranging from the thirty-second to the sixteenth of a grain; the potassium iodide in from two- to five-grain doses.

CASE I.—On March 18, 1884, I was called to see J. A., aged sixteen years, whose parents informed me that for some time he had been in failing health with cough. The family history was bad, several maternal uncles having died of acute phthisis. His condition was at once seen to be very serious—pulse rapid, fever high, profuse sweating, body weight much reduced, solidified lung, and the other physical signs denoting a rapid destruction of its function and its substance.

Prescribed veratrum viride to control heart's action, and put him on bichloride of mercury and potassium iodide three times a day. Improvement was perceptible within a few weeks; the parents were instructed to continue the medicine for a year or more. I occasionally saw this patient until September of the same year, when he appeared to be in almost robust health, having reached that condition by slow and steady progress. His parents considered him entirely well and discontinued the remedy. I was again called to see him on April 30, 1885; found the disease had redeveloped during the latter part of the winter, and had, in fact, produced a hopeless condition, from which he soon died.

CASE II.—William H., adult, was seen March 4, 1885. There had been a steady decline in health for weeks; his left lung was solidified almost throughout its entire extent, bronchial respiration, moist râles, temperature of 103°, pulse 125; great emaciation, night-sweats, cough with bloody expectoration; gave veratrum viride, applied a blister, and prescribed bichloride of mercury and potassium iodide, which he began taking in a few days. Improvement was slow but uninterrupted when once established; the remedy was continued for one year, during which time his lung returned to a nearly normal condition, his weight being seventeen pounds greater than ever before. Afterward this patient became dissipated, careless, went poorly clad, and was necessarily and unnecessarily

much exposed. During the latter part of the summer of 1888 he was overtaken by a rain-storm; from this exposure the disease was rekindled. He died in the care of another physician on the 30th of March, 1889, having lived three years of comparative health and usefulness from the time of the first attack.

CASE III.—Annie A., was seen in consultation. Family history of phthisis, from which disease she was suffering in its acute variety; fever, quick pulse, pulmonary consolidation, etc. The bichloride of mercury and potassium iodide were given, combined with fluid extract of phytolacca; convalescence was established in due time and maintained until perfect health was restored, and yet remains.

CASE IV.—Miss Mary B., just entering into womanhood; a maternal aunt died of phthisis. There were present in this case cough, very rapid pulse, loss of appetite and slight loss of flesh, percussion dulness at apex of right lung, disturbed sleep, menstrual period irregular. Other physicians examined this patient—considered her the victim of incipient phthisis; several months' treatment as above set on foot a recovery which a winter spent in Western Texas made perfect.

CASE V.—Mrs. W., about fifty years of age. History of consumption in her family; slight consolidation of left lung, temperature constantly above normal, pulse rapid, appetite poor, emaciation, hypertrophy and induration of liver and spleen. Prescribed arterial sedatives, and bichloride of mercury with potassium iodide; these remedies were continued for months with marked benefit. The following winter was spent in the mountains of West Virginia. The remedy being kept up, she returned to Missouri the following spring, and for two years which have since elapsed remains quite well.

CASE VI.—Henry F. (colored), aged fifteen years, member of a scrofulous family, brought to my office in the spring of 1885; condition was—solidified lung, exceedingly rapid pulse, temperature 103°, cough, etc., which warranted the gloomiest prognosis; it was difficult to believe that he could survive for six weeks, so worn was he and so extensive and formidable were the disease processes. Prescribed veratrum viride, bichloride of mercury, and potassium iodide. The change within eight or ten weeks was marvellous, local and general. Later in the summer, I met this patient riding horseback; he was fat, the ashy skin so indicative of ill-health in his race, having given way to an oily, shiny appearance of that great emunctory. Unfortunately this boy got so well that, in violation of instructions, all medicine was discontinued. While hunting the following winter the rebound of his gun fractured the nasal bones, suppuration and caries followed, his lung affection returned. I saw him the next spring; a resumption of the remedies failed to relieve him and he soon perished.

CASE VII.—Miss Mamie H., aged twenty years, consulted me on October 20, 1888. Father's family tuberculous; herself in second stage of phthisis. There was a cavity in apex of right lung, she suffered from frequent chills and almost constant fever; she had rapid pulse, distressing cough, profuse night-sweats, pleuritic pains, and occasionally diarrhœa; her appetite was gone, and that part of her body not entering into the composition of skin and bones rapidly going. She was given veratrum viride with bichloride of mercury and potassium iodide. There was some amelioration of her symptoms within three or four weeks, after which improvement was steady. In April, 1889, her condition was: No

fever, absence of chills and night-sweats, cough greatly diminished, unmistakable improvement in lung, and return of menstruation, twenty-four months absent. Miss H. weighed in December, after convalescence had begun, one hundred and thirteen pounds with cloak and overshoes on; in March, 1889, her weight was one hundred and nineteen and a half without those articles.

Case VIII.—Mrs. M., a young married woman, mother of three children, youngest born in January, 1889. Two weeks after delivery pneumonia developed, ran an ordinary course, resolution was imperfect; after being able to go into the yard, which she did, and from which she contracted a cold, her cough increased and fever returned. I saw her when this condition had existed for several days. The lung was again solid, pulse rapid, temperature 103¼°, soon after she was attacked with phlegmasia alba dolens of right leg, and within a few days the same state of affairs developed in the left, the lymphatics of the groins were enlarged and painful, her expectoration was bloody and contained lung fibre. This patient was given antifebrin and quinine, veratrum viride, bichloride of mercury, and potassium iodide.

It is now about three months since she has been bed-ridden with this combination of ills; for a time it appeared that she was a victim of general tuberculosis. The pulmonary condition was one of cheesy infiltration, the result of catarrhal pneumonia, from which, Niemeyer says, "patients usually die in a few weeks consumed by fever." That author gives this as one of the forms of phthisis pulmonalis. I visited Mrs. M. last on the third of May; found her sitting up rocking to sleep her babe; pulse 75; temperature 98½°; appetite good and had been for weeks. The lung is yet far from sound, slightly dull on percussion, and very feeble respiratory murmur. This patient had two maternal aunts to die with phthisis. I shall insist upon her continuing the mercury and potassium iodide for twelve or eighteen months.

Case IX.—Master G., four years old, of phthisical family, is recovering from a very similar attack, of three months' duration.

It is not claimed for this remedy that it is a specific; it has failed in the writer's hands in aged patients, and notably in a case of intestinal tuberculosis, although guarded in this case by opium.

On the other hand, I am certain that it has arrested the disease in its incipiency in persons to whom it has been administered, who were members of families which I had seen almost decimated by acute tuberculosis. Cases of this variety are excluded from this paper for the reason that, although the other symptoms of phthisis were present, the pulmonary condition was equivocal.

Since beginning the preparation of this paper I have searched all the medical literature within reach for the history of any use of the mercuric chloride in phthisis. Only one reference has been found. In a paper read May 22, 1888, Dr. Nelson L. North, of Brooklyn, mentions a number of drugs that have been beneficial in consumption; among the others, he says, "the chlorides of mercury, especially the bichloride,

have, I believe, been the means of doing much good." THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES for December, 1888, says:

"Dr. A. Dochmann, after reviewing the literature pertaining to the employment of mercury in phthisis, says, that in his experience calomel has a rapidly favorable action in ordinary forms of anæmia, even in cases in which iron has been without effect. It increases the appetite, removes constipation, and regulates menstruation long delayed. Then there is an anæmia the result of an already existing phthisical dyscrasia. As is well known, iron in these cases is entirely without benefit, and even sometimes injures by disturbing digestion.

"Pulmonary affections, so slight as to be overlooked, often present such symptoms with disturbance of nutrition. As the disease advances slight fever appears, with slight dry or mucous cough, and, finally, objective symptoms become evident. In such cases treatment with calomel for two or three months is followed by the best results, appetite increases, cough and fever diminish, or even disappear, and the night-sweats cease. It prevents decomposition in the intestinal tract, and does not interfere with the digestive ferments." The Editor adds: "G. Martell has for three years been using calomel in tuberculous processes, and has accorded to it the first position as a specific antiseptic. He has had the most favorable results from it in tubercular disease."

The preparations of mercury have long stood without a rival in the treatment of syphilis affecting any portion of the body. Wherein does the pathology of a syphilitic lung differ from a phthisical lung? To appreciate more clearly what this difference is, or is not, it is necessary to quote the words of some of those who are entitled to a hearing on this subject. Dr. Thomas J. Mays, Professor of Diseases of the Chest at the Philadelphia Polyclinic, in a lecture delivered January 28, 1889, on syphilitic phthisis, reviews the fifty-eight post-mortems of Hiller, and says:

"From these data it may be observed that syphilitic phthisis does not differ materially in its anatomical aspects from the non-specific, or ordinary, variety."

Walshe, on this subject, says:

"There seems to be nothing distinctive in the anatomical characters of the syphilitic variety of the product, and the connection between the low quasi-inflammatory process producing it, and syphilis, is only to be established by the antecedents of the individual and the coexisting positive results of tertiary syphilis."

Wilson Fox, in Reynolds's *System of Medicine*, says upon this point:

"Syphilitic growths in the lungs certainly bear a closer resemblance to tuberculous formations than is presented by almost any other morbid change in this organ;" and further remarks, "I would not, without much further personal experience than I possess on this subject, venture to affirm that syphilitic changes in the lung are identical with tubercle; but it is impossible to study the observations of those who have investigated both processes, and particularly the researches of Virchow, without being convinced of the close analogy between them."

From this striking likeness of the two diseases, it is certainly rational to expect much of that remedy in the one which is the sheet-anchor of hope in the other.

Upon the curability of phthisis, I desire to quote Dr. Aufrecht, Chief Physician at the City Hospital of Magdeburg. In four discourses delivered before the medical society of that city, he says:

"Since the discovery of the tubercle bacillus, the tendency has been to consider the medical treatment of this grave disorder as little better than fruitless, until some certain specific is found against the parasite."

From this opinion or tendency he positively dissents, and maintains that "it is folly to remain inactive awaiting such discovery."

"After a careful study of the investigations of Koch, he does not believe in the causal relation of the bacillus tuberculosis to phthisis, which, if true, would imperatively demand the isolation of the sick. He maintains that the only possible therapeutics of phthisis must be based on clinical experience.

"In his opinion, under continued medical care, supported by dietetic and therapeutic means, especially if applied at a very early stage of the disease, pulmonary consumption, or, more precisely speaking, the lung diseases leading thereto, afford a better prognosis than other chronic diseases."

That the bichloride of mercury acts in phthisis primarily through the nutritive processes, appears most probable. Dr. George Cornet, of Berlin, experimented with eight germicides, including bichloride of mercury, to determine their action upon animals inoculated with tubercle; not one of which could be proven to have influenced the progress of the disease, *although all* were given in *maximal* doses, and adds: "Indeed, many of the animals died from the effects of the drug, or showed marked symptoms of poisoning." Dr. Cornet further says:

"That he would be a bold therapist who would inject a half pint of a 1 to 1000 solution of bichloride of mercury daily, in the hope of obtaining such a saturation of his patient that he should be unfit ground for the existence of the germs already within him."

Such a one would certainly add to his boldness the extreme of folly. It is very evident that Dr. Cornet did what Professor Keyes said excessive doses of mercury would do—*i. e.*, produce fatal results. In fact, he admits that the animals, or many of them, were poisoned. He, therefore, defeated the object sought to be obtained, hastening the disintegration of the blood and the death of the animal.

From an experience beginning in March, 1884, and extending to the present, it is my opinion that we have in the different preparations of mercury, administered to phthisical patients in small doses, the most potent weapon with which to combat this most malignant foe of mankind; that in a majority of its victims, so treated, improvement may confidently be expected, and a goodly per cent. cured.

IMPERFORATE ILEUM.

By J. Bland Sutton, F.R.C.S.,

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Imperforate ileum is a term I wish to apply to a congenital defect in the small intestine induced by variations in the obliteration of the vitello-intestinal duct. Although imperforate anus or rectum and imperforate pharynx are well recognized, similar defects occurring in the duodenum and the ileum have never met with the attention they deserve, although they are of interest to the surgeon.

On the present occasion my remarks will be confined to the ileum, and as the condition under consideration depends upon the vitello-intestinal duct, it will be necessary to review briefly the main facts in the anatomy of the yolk-sac and its duct. The degree of development of this remarkable organ varies greatly in different vertebrates. In placental mammals it is usually small; in birds, reptiles, and fish it is large. In all it is a temporary store of nutriment, whilst in some sharks—*e. g.*, *Mustelus lævis*, as Aristotle knew, although the matter was neglected until rediscovered by Johannes Müller, the long-stalked yolk-sac develops a number of villi which fit into depressions of the uterine mucous membrane, like chorionic villi into the decidua of most mammals. A similar condition also pertains in *Carcharias*.

In its typical form the yolk-sac is connected by means of a duct with the intestine, and it is somewhat curious that although the sac is in direct communication with the bowel, the yolk is absorbed by the vitelline (omphalo-mesenteric) vessels ramifying on its walls and thus conveyed to the embryo. In elasmobranchs, however, the yolk passes into the intestine by the duct, as well as by the indirect route through the vitelline vessels.

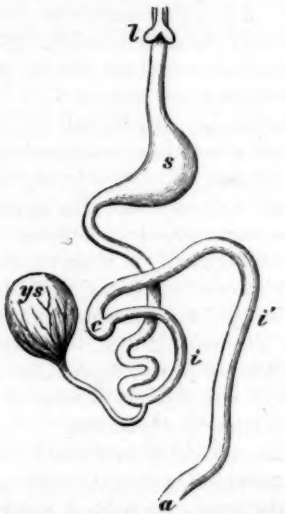
We are thus faced by the curious fact that although this sac communicates with the intestines directly, its duct, except in the case of elasmobranchs, is functionless.

In mammals, at the time of birth, the yolk-sac and its duct are normally reduced to very slender proportions, and occasionally may be detected as delicate structures attached to the umbilicus. In birds the duct at the time of hatching is usually seen as a nipple-like process standing upon the free surface of the ileum. In most fish it is very large and conspicuous, and remains attached to the young fish for many days after hatching. In some mammals, as rodents and carnivora, the yolk-sac is conspicuous among the membranes. The relation of the yolk-sac

and its duct, or umbilical vesicle as it is often called in the human embryo, is somewhat diagrammatically shown in Fig. 1.

Before discussing the abnormalities presented, or caused by, this duct, it is necessary to state that the vitello-intestinal duct consists of two parts, an intra- and an extra-abdominal segment. The intra-abdominal portion extends from the ileum, at a spot varying from one to three feet from the ileo-cæcal valve to the umbilicus. This portion of the duct usually disappears long before the distal or extra-abdominal portion,

FIG. 1.



A diagram showing the relation of the duct of the yolk-sac, *y s*, to the ileum, *i*; *s*, stomach; *l*, lung; *c*, cæcum; *l'*, large intestine.

which, as has already been stated, frequently persists in many orders of mammals until birth and is shed with the placenta. Dr. William Allen has suggested that the early disappearance of this, the intra-abdominal section of the vitelline duct, and the persistence of the sac and extra-abdominal piece of the duct, may be explained thus:

"The umbilical intestinal loop is drawn into the abdominal cavity as the rest of the alimentary canal grows; this movement, then, on account of the fixed position of the umbilical vesicle outside, causes the vitelline duct to be stretched, so that it very probably soon ruptures, and is then speedily absorbed."—*Journal of Anat. and Phys.*, vol. xvii.

We will concern ourselves with the abnormalities of this intra-abdominal segment of the duct. This portion, instead of disappearing, may grow *pari passu* with the gut, and may even equal it in size; it is then

known as Meckel's diverticulum, for it is to this distinguished anatomist we are indebted for a clear account of the abnormality and the relation it bears to the vitelline duct. Meckel's accounts of this structure, the clear and convincing method he adopts in associating this so-called diverticulum with the duct of the yolk-sac, are models of anatomical investigation and leave not a shadow of doubt as to their accuracy, so that, at this distance of time, we may really wonder why Cuvier, Oken, Emmert, and others expressed sceptical opinions as to the correctness of Meckel's conclusions.

In its most complete form the persistent duct opens at the umbilicus and bowel-contents escape externally. Such a specimen is usually provided with a mesentery, has all the structural characters of small intestine, and presents Lieberkühn's follicles and Peyerian patches. Such a complete duct is rare. More frequently it exists as a nipple-shaped prominence standing from the free border of the ileum, resembling that seen on the ileum of a newly hatched chick. The duct may be two or three inches long and then be continued as an impervious cord to the umbilicus. In exceptional cases the diverticulum has been eight and even ten inches in length. Usually the end of the diverticulum is rounded like the bottom of a test-tube, occasionally it is hammer-shaped. In rare instances a diverticulum has been found distended into a cyst holding several ounces of fluid. Such specimens occur usually in fœtuses otherwise malformed.

In its variations, structure, and pathological deportment the intra-abdominal portion of the vitelline duct is on all fours with the vermiform appendix. This structure may be absent, or vary in length from one to four, or even eight inches; sometimes it is an impervious cord, possesses a mesentery, and at times is dilated into a large cyst.

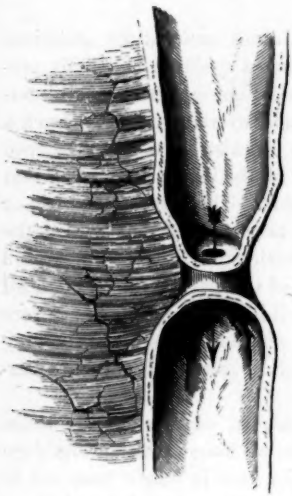
Thus far we have studied examples of abnormal persistence of the duct; we must now consider some specimens of the reverse condition, excessive coalescence of the duct. Normally, the obliteration of the duct becomes arrested at the spot where it joins the ileum, and the process of obsolescence is so complete that the most critical eye fails to detect the least evidence of its former existence. Occasionally the obliterating process exceeds the normal limit, and involves the wall of the bowel, giving rise to a shallow furrow running round the gut. This furrow often corresponds to a diaphragm on the inner aspect of the bowel; the centre of the diaphragm is perforated (Fig. 2).

In another case the bowel becomes so narrowed that the ileum presents a sort of constriction or isthmus. This isthmus varies in size, but may be as narrow as a crow-quill. The ileum on the proximal side of the constriction is dilated, the walls thickened, and the muscular coat hypertrophied (Fig. 3).

In a third class of cases the ileum will be found interrupted, as in

Fig. 4, the prominent end being distended and the distal end shrunken. The degree of separation varies greatly. In my first specimen the two culs-de-sac were lying side by side; in my second and third specimens they were separated by about an inch, and a gap measuring twelve inches has been found between the ends. Exceptionally the ends may be joined by an impervious band of fibrous tissue.

Fig. 2.



A valve in the ileum. (Semi-diagrammatic.)

Fig. 3.

The ileum interrupted by a narrow isthmus. (Semi-diagrammatic.)

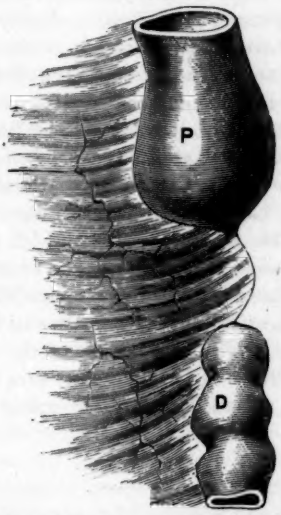
In two recorded cases the intestine below the interruption was narrow, shrunken, and traversed by an almost capillary lumen as far as the ileo-cæcal valve. Such a shrivelled condition may even be presented by the big gut under such circumstances.

Up to the present time I have had opportunities of dissecting three specimens of completely imperforate ileum. The first two came to hand in the ordinary course of dissections conducted on stillborn children; my third specimen has an interesting history:

In June, 1889, my friend, Dr. Maxwell, asked me to see a baby forty-eight hours old, concerning which he furnished the following history: The abdomen was found distended shortly after birth, and the baby commenced to vomit its food. On examining the anus the parts were found quite normal, and a catheter could be passed readily into the bowel for many inches. Nothing but mucus passed by the anus. It was clear that we had not to deal either with imperforate anus, rectum, or pharynx, as the infant could swallow easily, and as it retained milk for

a time, imperforate duodenum was excluded. I therefore came to the conclusion that, we had to deal with an imperforate ileum. At the request of the parents, I explored the abdomen, and found the ileum imperforate at a spot about eighteen inches from the ileo-cæcal valve. The distal end of the ileum was somewhat shrunken and separated from

Fig. 4.



Complete form of imperforate ileum. P, proximal; D, distal cul-de-sac.

the proximal end by a gap an inch across, Fig. 4. The upper cul-de-sac was dilated with meconium, and congested; this was removed and the end of the gut stitched to the abdominal wound. Meconium and flatus passed freely, the child rallied and took food, and the case promised to go well, but about six hours later it suddenly expired.

As far as I know, this is the first time the existence of an imperforate ileum has been diagnosed during life, and it is probably the first time an attempt has been made to deal with such a condition operatively. Cases of this sort in infants are surely fatal, but the less marked examples, such as the cases described by Mr. C. L. Hudson, in *Trans. of the Pathological Society*, vol. xl., are not incompatible with life, for both these specimens were taken from youths.

These patients, however, died with symptoms of chronic intestinal obstruction. It is very probable that some specimens of narrowing of the ileum, which have been ascribed to contraction of the mesentery, really are abnormalities connected with the vitello-intestinal duct.

The grounds for attributing defects of the ileum to excessive coalescence of the intra-abdominal section of the vitello-intestinal duct are

these: Congenital obstruction and narrowing of the alimentary canal are always found in the situation of embryological events; for instance, imperforate pharynx occurs at the spot where fore-gut and stomodæum come into contact. An imperforate or septate duodenum occurs just above the bile papilla, the region where the diverticulum issues to form the liver and pancreas. Imperforate rectum and anus are due to imperfect union of the hind-gut and proctodæum. Lastly, imperforate ileum occurs in the region where the primitive alimentary canal is in communication with the yolk-sac by means of the vitelline duct. My views concerning the relation of this duct to imperforate ileum were originally put forward in some lectures I delivered at the Royal College of Surgeons in 1887, and published in abstract in the *Lancet* of the same year. Since then this view as to the connection of the defects in the ileum with the vitelline ducts has been rendered stronger by some specimens admirably reported by Mr. C. L. Hudson, to which allusion has already been made. These specimens are valuable, as we are now able to trace every gradation from a persistent duct to complete division of the ileum.

My object in drawing attention to this matter is, that those who have opportunities of investigating this condition of the intestines in fœtuses and young children, will be induced to place such cases coming under their notice on record, as additions to our scanty knowledge of this curious defect.

LOCAL TREATMENT OF DIPHTHERIA.

By J. C. Mulhall, M.D.,

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There is hardly a familiar disease concerning which the evidence of witnesses is more conflicting than in diphtheria, no matter from what standpoint it may be viewed. Statistics, based on mistakes in diagnosis, on the varying nature of epidemics, on faulty reports as to anatomical regions invaded, and on our own general ignorance as to its method of diffusion, its etiology and pathology, no doubt account for this confusion. A vast number of agents have been employed in the local treatment of the disease with the usual conflicting testimony as to value. It is, however, chiefly concerning the *method used in their application* that I desire to draw attention to a plan which for four years has yielded me gratifying results.

When I originated this plan, I took for granted several propositions commonly accepted by observers. *First.* That the disease is a germ

disease. *Second.* That in the vast majority of cases the specific microbes selected the tonsils as their initial culture soil. *Third.* That unless checked by germicides their colonization usually resulted in local putrefactive changes with general secondary septicæmia. *Fourth.* That implication of laryngeal or nasal chambers largely increased the mortality. *Fifth.* That the disease is acutely adynamic.

It occurred to me, therefore, that, as was already largely practised, the local treatment should be chiefly antiseptic, and that, as the disease spread rapidly and the salutary effects of antiseptic solutions in the upper air-passages, from anatomical reasons, could be of but short duration, this antisepsis should be, if possible, continuous.

It will be readily admitted that it is of the utmost importance to maintain the patient's strength and that, therefore, an element in ideal local treatment, is, other things being equal, the employment of agent and method which least harass the child and which permit throughout the recumbent attitude.

It suggested itself that a method which washes out from the throat the perverted secretions is preferable to that which invites a subject too young to expectorate to swallow them, and which permits the larynx to be bathed in them, as must occur in the use of a spray. The instrument with which these requirements can best be met is one which is found in nearly every domicile, namely, the common household syringe. It is a fact not generally known that if the end of such an instrument be introduced into the pharynx or into the back part of the mouth of a young child, that the throat can be boldly flushed and without causing gagging, vomiting, coughing, or strangulation. Reflexly, the tongue immediately retracts, pushes the epiglottis down, making a water-tight glottis, and the child involuntarily ceases to breathe, whilst the pharyngeal irrigation goes on.

The first treatment, like any other first local treatment in a young child, is met with repulses, but even very young children soon learn to appreciate the agreeable effect of clearing the throat of foul and adhesive secretions, and soon quietly submit. With badly trained children, some of whom even repulse the nurse when she smears the nostrils and lips with a soothing ointment, I commonly use the rectal tip, or better a pewter tip, which can be curved so as to be insinuated behind the last molars; but ordinarily I use no tip, simply the rubber hose, which is soft and has the further advantage of providing a larger stream.

The physician himself carries out the first treatment as a demonstration to the nurse. The child lies in a crib, one side of which is open; a rubber cloth conducts fluids into a vessel, the child's head is brought to the edge, the face turned toward the vessel, and the flushing is rapidly accomplished. The exertion even of sitting up is avoided.

Usually, I direct the washing to be done every hour in the waking state, and never to permit the child to sleep three hours without it.

I have used various antiseptics. I prefer a mixture of carbolic acid and compound solution of iodine, properly diluted with warm water, which frequently in addition is saturated with boracic acid. An ordinary water tumbler of fluid is consumed at each irrigation.

This plan is so far imperfect, since it does not provide for disinfection of the post-nasal region, and there are few cases of diphtheria which do not implicate this region, rich in lymphatics and, probably next to the tonsils, most frequently the line of poison march to the system at large. I have been amazed in consulting practice to observe the frequency with which the nose has been neglected until serious nasal signs, such as hemorrhage, fetor, or total obstruction have compelled some kind of attention, very often too late, for this triad of symptoms is most commonly the harbinger of death.

If we consider that the general practitioner is usually unacquainted with rhinoscopy; that even the expert is often foiled in illuminating and seeing the nasal cavities of a young child; that the nose, which the evening before seemed uninvaded, is found in the morning to be seriously affected; it can hardly be gainsaid that prophylactic treatment of the nasal cavities in pharyngeal diphtheria is a wise therapeutic measure.

Antisepsis of the nasal cavities can do no harm, whilst it may prevent, or render mild, invasion from the throat. Moreover, since for many reasons we cannot in these cases treat the pharyngeal vault from the mouth, the anterior nasal cavities form ready avenues of approach for the disinfection of this region—and this is an integral part of my plan of continuous antisepsis. Let me repeat, that apart from this being a channel for the antiseptic treatment of the throat, *I desire to recommend strongly to the profession that in every case of diphtheria, whether the nose be affected or not, that the nasal cavities be kept strictly sterile from the first.*

The method of accomplishing this varies. When it is clear that neither the post-nasal nor nasal chambers are attacked, the frequent insufflation of a non-irritating antiseptic powder may be sufficient. When uncertainty exists, or it is apparent that invasion has taken place, the nurse is instructed to wash out the nasal cavities with the same antiseptic solution as that employed in the throat, except that it should be far weaker, so as to irritate the nose as little as possible, and should seldom exceed in amount more than two teaspoonfuls for each nostril. The child, if possible, clears the nose and the antiseptic powder is at once forcibly insufflated. This, as the child lies on its back, gradually trickles into the pharynx and assists in the plan of continuous antisepsis. I commonly use finely powdered sulphur, or iodoform, or salicylic acid highly diluted, with a trifle of cocaine to prevent irritation.

This cleansing of the nose should not be done with the household syringe, for it throws a stream too small in diameter, and one far too forcible in careless or unskilful hands, nor does it permit of the regulation of the amount of fluid to be injected.

The point of the ordinary glass syringe introduced into the nostrils of an impatient child is apt to produce an undesirable wound of the septum. Moreover, the calibre of the nozzle is far too small, permitting a slender, swift, painful, and inefficient stream. The syringe made for me by Mr. J. M. Good, a druggist of St. Louis, fulfils, I believe, the ideal requirements of a syringe for anterior nasal medication in young children. Its capacity is about two drachms. It terminates in a bulbous enlargement which prevents a forcible stream, forms a shoulder to rest against the margins of the nostrils, and since it terminates abruptly in the nozzle, cannot enter the nose and abrade its mucous membrane. The diameter of the outlet is one-fourth of an inch, thus permitting a large yet gentle stream. Before I invented this syringe I was in the habit of filing through a small glass syringe at its neck where the diameter was large, thus avoiding the objections to the tip. The nozzle thus altered should be held in an alcohol flame to smooth away irregularities.

The frequency with which the nasal cavities should be irrigated is a matter of individual judgment. Gently and quickly done with agents that are not painful, children readily submit to it—an important matter, for whatever the plan of local treatment be in the adymamic diseases of children, that plan is best which, other things being equal, meets with least resistance.

The rapid dissolution of the membrane is undoubtedly an element of successful local treatment, and I frequently make use of solvent remedies immediately succeeding the cleansing of the diseased surface. I have best succeeded with papoid.

There is but one method of local medicinal treatment which can be efficiently pursued in the laryngeal diphtheria of children: that by vapors. At appropriate stages the inhalation of the fumes of slaking lime deserves always to be remembered.

I beg leave to call attention to a modification of the plan of Delthil, which I have hitherto employed in seven cases with a final result of four recoveries and three deaths. A small apartment in the house is selected, the carpet and other belongings removed; the room is thoroughly fumigated with sulphur, and a sheet saturated with a disinfectant spread across the doorway. A gas-stove is introduced which will support two vessels. Into each is poured a half gallon of water. Into each of these a half pint of pine tar is stirred and a tablespoonful of oil of turpentine. As steam is generated water is occasionally added, so that the half gallon mark is maintained. The amount of tar will be sufficient for the entire treatment, but to each vessel is added every hour a tablespoonful of the

oil of turpentine. I have not as yet observed strangury, or the characteristic odor of the drug in the urine. The air from outside should be admitted several times daily. The heat from the gas precludes this method in warm weather.

In three of my cases, with one death and two recoveries, I was able to demonstrate membrane with the laryngoscope. The four children safely passed the laryngeal crisis with but little cough and no glottic spasm. In a boy aged four, seen with Drs. Holland and Frazer, of St. Louis, who died on the seventeenth day from exhaustion, but the slightest dyspnœa was at any time observable, though total aphonia existed, and I was able to demonstrate to these gentlemen the presence of membrane in the larynx. The steam is generated day and night, and in one of my cases was continually done for six days.

In diseases in other parts of the body, whose natural termination is in putrescence, the surgeon, in anticipation of this event, or on its actual arrival, thinks first of antiseptic measures.

It is, therefore, probable that analogous measures are the best that can be employed in diphtheria.

I have endeavored to describe a reasonable method of execution.

HYSTERICAL ANÆSTHESIA, WITH A STUDY OF THE FIELDS OF VISION.

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The achromatopsia, or dyschromatopsia, which has been described by various authors as occurring in hysteria, and especially in those cases in which the not uncommon symptom of hemi-anæsthesia is present, was first studied by Galezowski,[1] especially in Charcot's wards of the Salpê-

[1] Galezowski (Thèse, 1865, p. iii.) reported the first case of hysterical amblyopia, which was observed in the service of Dr. Grisolle, in the Hôtel-Dieu. The patient was a Miss V., aged nineteen, who, in addition to the entire list of hysterical symptoms presented trouble with the left eye to such an extent that she could only read large letters, and had complete internal hemiopia. With this eye she had also lost the faculty to distinguish colors, so much so that yellow and pink appeared white; red and blue seemed black. This condition lasted for two weeks. See also Gazette des Hôpitaux, 1877, page 75.

trière. Briquet has called attention to the forms of amblyopia which sometimes accompany hysterical losses of sensibility, and Landolt,[1] also working with Charcot, examined and reported many cases. These all seem to have presented unilateral anæsthesia with changes in the extent or arrangement of the fields of color-vision, chiefly in the eye of the affected side, or total loss of color-perception in one eye. It is rarely, says Landolt, that both eyes are not in some degree deranged.

Charcot describes the arrangement of the color-fields as follows:

"There are colors for which the visual field is physiologically more extensive than for others, and these differences in extent of the visual field are always reproduced, following in every case the law for each color. Thus, the field for blue is the largest; yellow, orange, red, green follow in this order, and last, violet is perceived only by the most central portions of the retina. In the pathological state with which we are concerned these characteristics of the normal condition appear in some sort exaggerated, but in varying degrees. The various circles which correspond in the examination with the limits of vision for each color, narrow concentrically after a fashion more or less marked, following the rule established by the normal condition."

Instead of simple concentric diminution of the color-fields, some of the French patients had a reversal of the order of occurrence of the colors, and some bad cases had absolute loss of the color-sense, seeing everything, as Bernutz phrases it, like a sketch in India-ink.

Bernutz, in speaking of the loss of sensibility in hysteria, says that

"Anæsthesia, either of the whole body, which is infinitely rare, or of one-half, and that usually the left half of the body. . . . constitutes . . . . one of the primordial symptoms of this neurosis."

He adds that it may be said to be a general rule that the anæsthesia is limited to one part, perhaps of the skin of the body, perhaps of the mucous surfaces, in especial that of the conjunctiva of the left eye, "which exists in almost every hysterical subject, with or without achromatopsia, as described by Galezowski."[2]

Since attention was called to these cases in this country, many have been carefully studied for color and general pain- and touch-senses in the clinic of Dr. Weir Mitchell at the Infirmary for Nervous Diseases, and the following reports show some of the results. We have not thought it necessary to give the histories of our patients in more detail than would suffice to show their hysterical characteristics clearly, and careful statements of the tactile, thermal, and pain sensibility—as these are the points of whose relations with the changes in the color-sense we wish to speak.

CASE I. *Complete hysterical analgesia; aphonia; normal visual fields.* —Private patient, aged sixteen, small for her age. She has been menstruating irregularly without pain, and is the youngest of a large family in the South. She had been indulged from her birth and had naturally

[1] Archiv de Physiolog. normal. et patholog., tome ii, 1875, p. 624.

[2] Nouveau Diction. d. Méd. et Chir., art. Hysteria.

lost all power of self-control, having been denied the advantages of control by others.

In May, 1888, she became nervous and was taken ill at a school whither she had been sent against her will. During this illness an overdose of mercury slightly salivated her, and after this she became better. She was at this time attacked with aphonia, became very violent, refusing all food for days, and screaming if any noise offended her hearing, which had become extremely sensitive. The bowels were costive and had to be kept open by enemata.

A careful examination showed all her organs to be in good order, but she had what has been described by Dr. Mitchell, in his book on the *Nervous Diseases of Women*, as "hysterical ataxia." The fear of a fall or other accident from this trouble of incoördination indisposed her to attempt to walk, or to use her will, and she was becoming rapidly will-less. The urine was clear, but it was passed only once in twenty-four hours, sometimes only once in forty-eight hours, and then not more than two or three ounces. For some weeks she did not pass more than four ounces a day. She was analgesic from head to foot, almost as completely so as was Case II.

It is best illustrated by saying that she had no sensation in the breast or under the finger-nails. The most severe test of this condition with which we are acquainted, is the use of a faradic current with two wire brushes on the nipple. To this she was perfectly indifferent. Nevertheless, her sense of touch was fair and her localization good, but her appreciation of thermal differences was very feeble. Unless the temperature was extreme, she found it difficult to decide if it were heat or cold.

The examination of the eyes revealed the following conditions: Vision one-half and two-thirds respectively of normal, which, by the correction of a hypermetropic astigmatism under a mydriatic, rose to full sharpness of sight. The following formula was found to correct the optical error:

$$\text{O. D.} + 1.00^{s} \supset + .90^{c} \text{ axis V. } \frac{20}{xx}.$$

$$\text{O. S.} + 1.50^{s} \supset + 1.^{c} \text{ axis V. } \frac{20}{xx}.$$

There was deficiency in the amplitude of accommodation corresponding to the error of refraction, together with a low degree of insufficiency of the internal recti. The ophthalmoscope revealed oval disks, somewhat distended and slightly tortuous retinal veins, with undue prominence of the central lymph sheaths. There were no abnormal pupillary phenomena. The form-fields in each eye were absolutely normal. The color-fields—blue, yellow, red, green—followed in the order given and without any material contraction. Thus in the right eye:

	Outward.	Upward.	Inward.	Downward.
Blue	75	38	42	48
Yellow	75	28	32	38
Red	55	30	25	35
Green	45	20	25	25

The left eye presented no material difference from that just recorded. These observations were several times repeated, the last time just before the patient was discharged.

It is not necessary here to go into the treatment, but the little savage was easily tamed, and after three months' time went home in blooming health and has had no relapse since.

CASE II. *Complete hysterical analgesia; nearly normal visual fields.*—Private patient, aged twenty, single, white, living in Pennsylvania. Family history unusually good. No injury, no special disease, no bad habits. She was in good health until she began to menstruate, between twelve and thirteen years of age. At this time she became easily excited by emotion whether of pain or pleasure. Her face began to twitch, and she suffered from a moderate amount of insomnia, which continued as she developed. At sixteen she had attacks of neuralgia in the head, face, and hands; these were not usually very great; occasionally they would be severe. Sometimes the headache would be in one eye, sometimes in the other. The menstruation, which up to this time had been perfectly normal, began to be painful. She complained of "ovarian tenderness." On examination there proved to be no uterine disease whatever. The organ was in place and normal, nor were the ovaries sensitive on vaginal exploration; nevertheless, the abdomen on both sides was extremely sore, and she had been said to have ovarian tenderness. The organs of digestion were in good order. The pulse was easily excited, but the arterial tension was normal. Respiration was 25; the pulse 85. The sleep is slight and easily broken. Her general strength is moderate, but a walk of two miles excessively fatigues her. Her station is bad; on closing her eyes there is three inches antero-dextral sway. There is no vertigo and her gait is normal. There is no paralysis anywhere. Tactile sensation appears normal. As regards her temperature-sense, she sometimes mistakes cold for heat, but never heat for cold, though this is an error sometimes made in health. She is absolutely analgesic from head to foot. There is no part of her body into which it is not easy to thrust needles without causing her any other sensation than that of mere touch. After she had been subjected to such an examination she could tell from the sensation when a needle was thrust into her, and recognized it as different from a touch, although it was painless. In order to give an idea of the completeness of this condition, it is only necessary to say that a needle could be run into her breast, or under her finger-nails, without giving her the least sense of pain. When she first came under treatment she was nearly insensible to the most violent electrical stimulus, perfectly so to heat. But after a time she regained to some extent the power to feel pain, although never the ability to feel a needle thrust into her. She did not suffer in the least degree from a faradic current going through a wire brush over a dry skin. Excepting that she is extremely sensitive to all emotion, there are no hysterical manifestations whatever.

By June, 1889, she made great general gain in strength, but scarcely any as regards sensory trouble, though well enough to be regularly at work as a nurse.

Examination of the eyes of this case revealed the following facts: Direct vision normal; slight decrease in the amplitude of accommodation corresponding to the presence of a simple hypermetropic astigmatism; no abnormal pupillary reactions; an insufficiency of four degrees of the external recti (esophoria). Each optic disk was a vertical oval, the nasal edge slightly blurred by hazy retina, and the transverse veins distinctly tortuous. An examination of the field of vision (Fig. 1) demon-

Fig. 1.

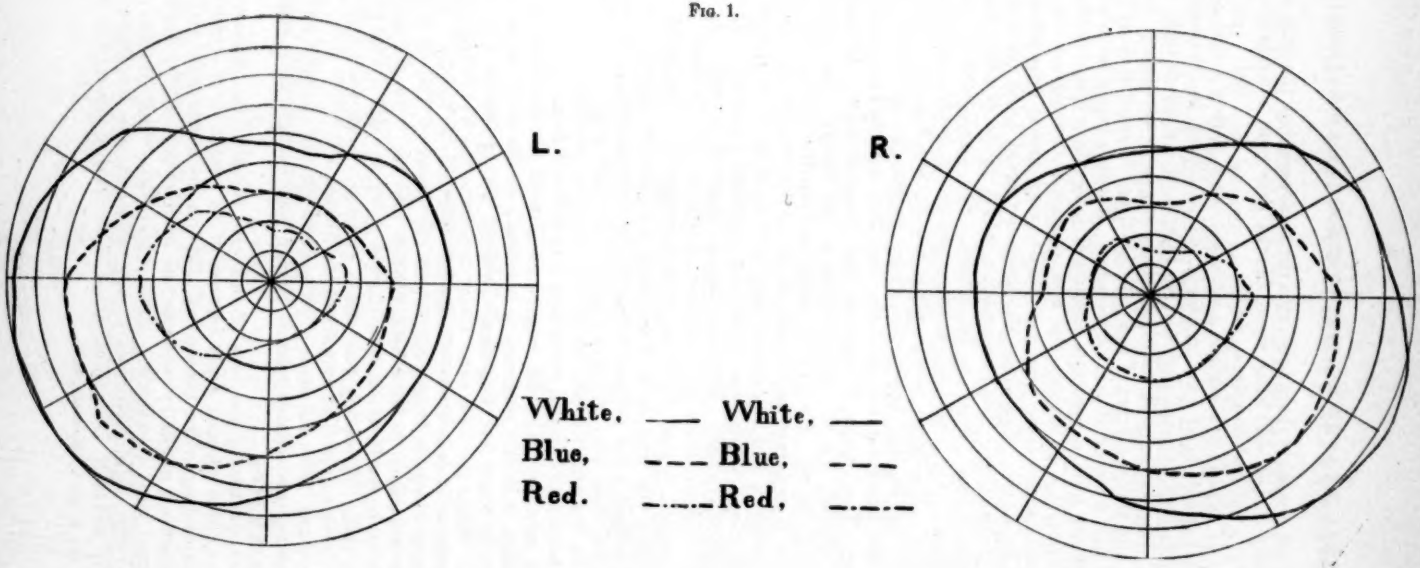
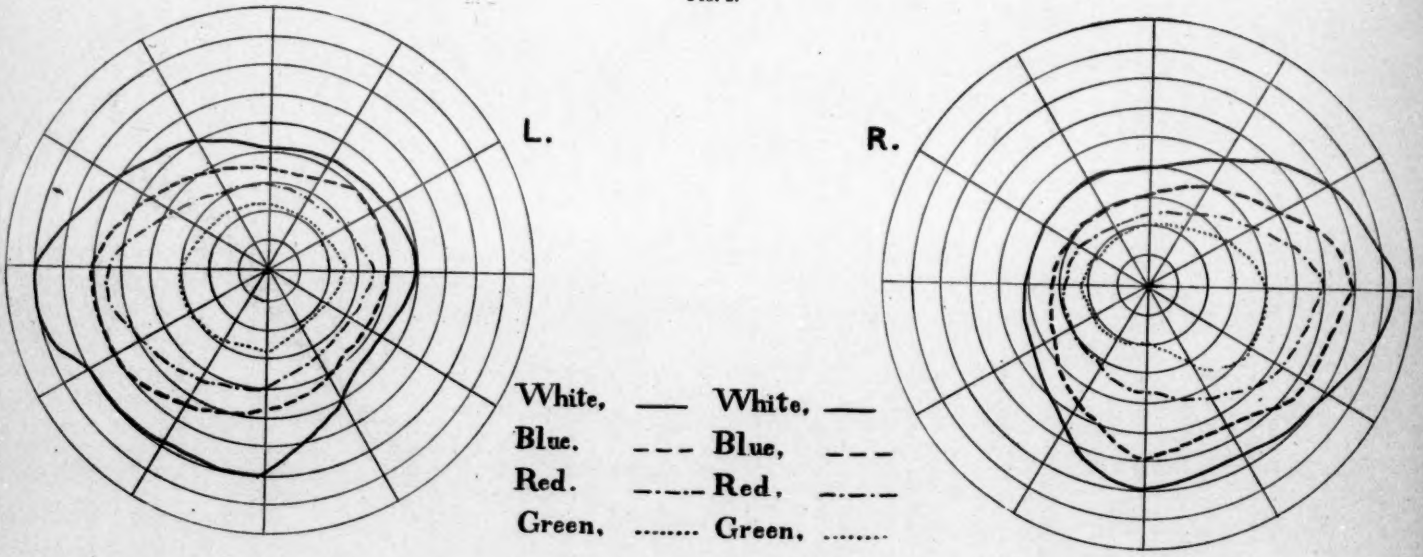


Fig. 2.



strated that there was no change in the relation of the colors one to another, and no decided contraction in the field of vision. This examination has quite recently been repeated now that the patient has gained in general strength, with the result of exactly confirming the previous observation, or, in other words, the field for form, blue, red, and green (green is not represented on the diagram; violet and yellow were not tried) was the same during the period of universal anæsthesia that it is now since the restoration of the patient to more perfect health.

CASE III. *Complete left-sided hysterical anæsthesia; contraction of visual field.*—The patient (private) is a case of neurasthenic conditions with highly hysterical developments. She is constantly in tears, and exercises emotion on the slightest occasion, and even when there appears to be no excuse for the display. She has slight twitching of the limbs, and occasionally hysterical hiccough. The remaining history of this case has no characteristic conditions.

When first seen, in May, 1889, the patient had a very indistinct sense of pain over the whole left side. The needle-prick was felt very little in most places. It was perceived better when plunged into the tissue deeply; it then created a sense of uneasiness. There were a few areas of insensibility. On the thigh and on the inside of the leg the needle-prick was better appreciated, but there was an unusual want of sensibility to pain in the left half of the face, the forehead, and the left hand, whereas in other parts of the body comparative pain was felt. The sense of touch was not quite perfect in her fingers' ends. She was able to locate impressions reasonably well. Heat and cold she could determine with tolerable ease. She was, therefore, a case of complete lateral left-sided analgesia.

The following notes describe the condition of the eyes: Central vision normal; no muscular anomalies either in the external or internal muscles. Oval optic disks, with slightly mellowed nasal edges, and full central lymph-sheaths. Low hypermetropia. The fields of vision (Fig. 2) exhibit concentric but irregular contraction without change in the normal order of white, blue, red, and green.

CASE IV. *Distributed incomplete hysterical anæsthesia; irregular contraction of the visual fields, and partial reversal of the normal relation of the colors.*—This case (private) does not differ greatly from other cases of the hysterical state. There is slight weakness of the legs. The proverbial mobility of all hysterical symptoms is well shown in the distribution of the anæsthetic areas. All over the body want of sensibility to pain is found in patches, but from day to day the situations of these spots vary very greatly. There is the usual complete acuteness of touch-sense, except that it is less perfect than normal in the fingers at all times.

Repeated examination showed that the areas of anæsthesia were frequent, and more marked in general upon the left side, especially the left arm and leg, while other spots of insensibility were distributed over the right side and scattered irregularly over the trunk, face, and limbs. The patient herself was fully conscious of the lessening of sensibility, and hailed with delight the rapid recovery of feeling under the daily use of the faradic current and a wire brush.

An ocular examination revealed no change in the central vision, in the external excursion of the eyes, or in the pupillary reactions. The optic disks were oval, the edges slightly blurred, and the refraction a low hypermetropia. The fields of vision (Fig. 3) revealed decided con-

Fig. 3.

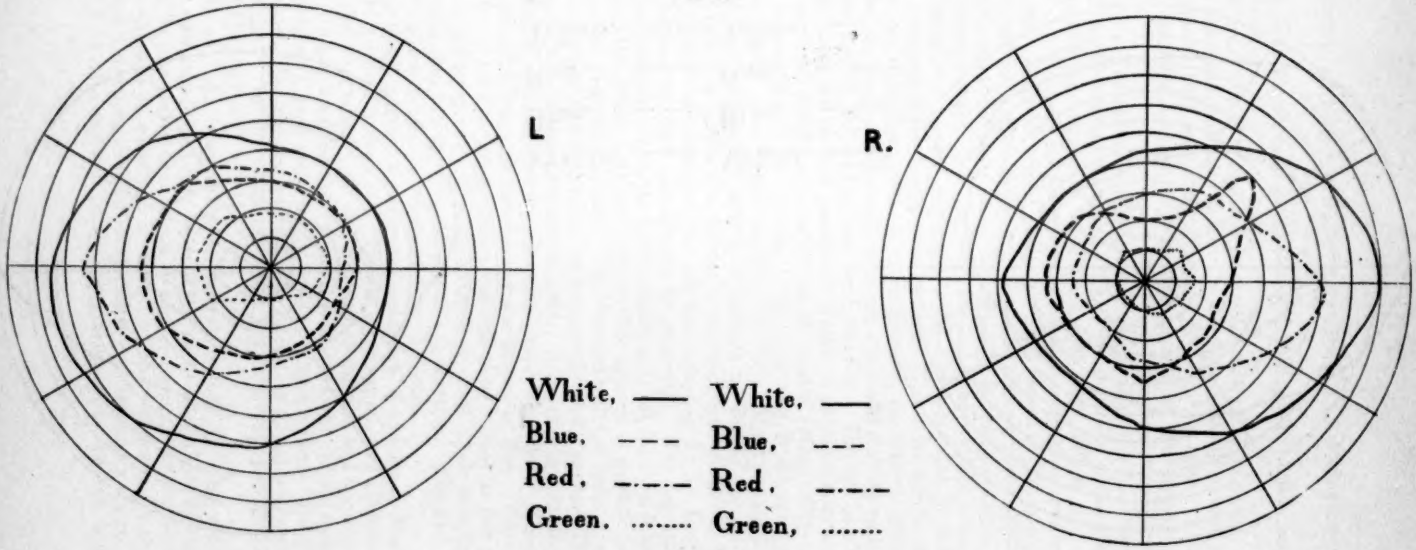
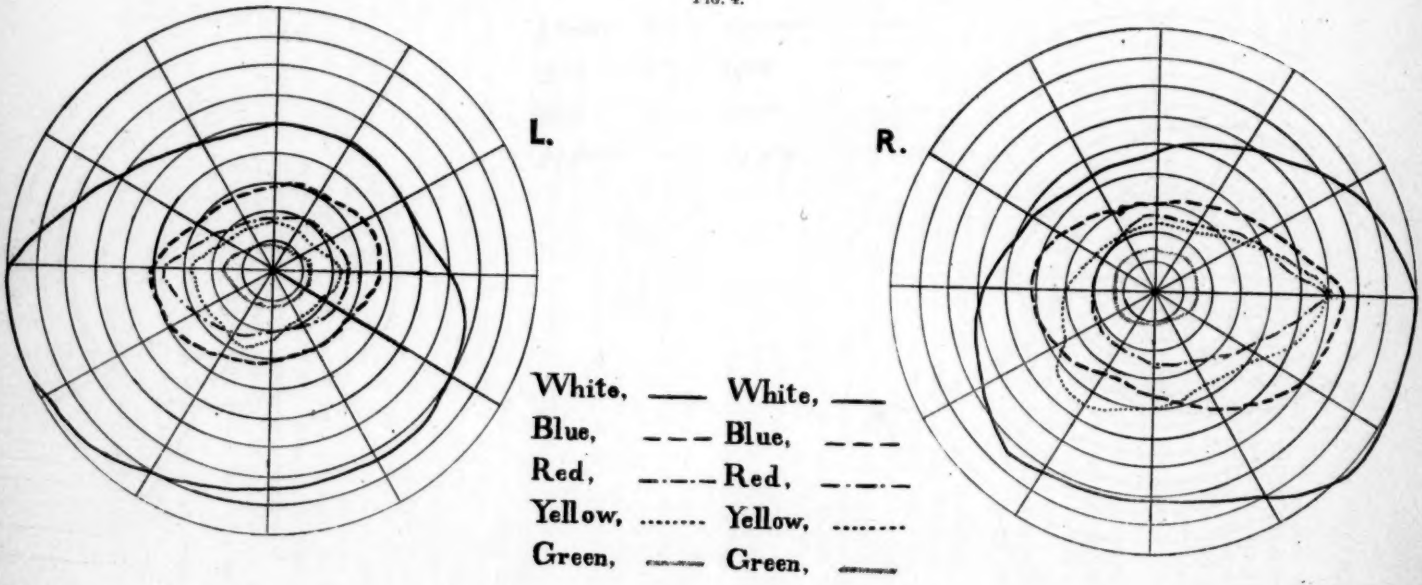


FIG. 4.



traction both for form and for blue, red, and green (yellow and violet were not tried).

Right eye: The blue and red lines cross each other in such a manner that on the nasal half and below, the blue is greater in extent, while in the temporal half and above, the red is larger in area. The green, greatly restricted, occupies its natural position in the sequence of the colors.

Left eye: The red field is greater in extent than the blue field in the entire circumference except at the horizontal meridian of the nasal side; the blue and then the green field, much contracted, follow.

CASE V. *Complete left hysterical anæsthesia; contraction and œdema of the left leg; irregular visual fields; partial reversal of the color-fields.*— Patient (private), aged thirty-one, is the mother of three children, the youngest born three years ago. Menstruation is nearly painless. There is no organic disease. In July, 1887, she had a sharp attack of dysentery, which lasted over a week, after which she had what was probably hysterical paralysis of the bladder and rectum. The urine had to be drawn off, and the rectum emptied of its contents by mechanical means. At this time she became extremely nervous, and had "sinking spells," with spasms of the left side of the face, head, and foot. The left hand became violently shut, and the foot passed into a state of extraordinary extension.

The difficulty chiefly complained of at present (May, 1889) is a hysterical contraction of the left leg. The knee can be straightened with difficulty, but it soon regains its bent position. If, as she states it, it is "locked" in a straight position, it remains so, but, if she attempts to walk, it instantly bends, and refuses to be straightened again. She has curious attacks of œdema of the left hand, lasting for an hour, caused by excitement, whether pleasurable or otherwise. The leg has also at times been swollen above the ankle, and nearly all the time it is a little swollen at the ankle. At her periods this œdema is greatly increased, and becomes then very notable. She has ache of the spine; in four or five places pressure causes pain, the situation of which varies. The whole left side is more or less insensible to pain. It is worse in some areas than in others. The sense of touch is considerably impaired. The compass points are not felt as two anywhere on the fingers or lips. The sensation as to heat or cold is imperfect on the left side. Heat is felt as pain, unless it is very great. This observation is often made in reference to other cases, and is somewhat difficult of explanation. The case is worse when seen than would be supposed from the notes.

The following notes describe the condition of the eyes: Vision two-thirds of normal in each eye. Pupils large, equal, and actively responsive to the reactions of light and shade, convergence, and accommodation. Distinct insufficiency of the internal recti muscles. Oval, rather gray, optic disks with hazy nasal edges. Many lymph reflexes throughout the eye-ground. No macular lesions. The refraction a simple hypermetropic astigmatism. In the fields of vision the following peculiarities were noticed (Fig. 4):

Right eye: An irregularly contracted form-field. The blue field is next in extent, except below and to the nasal side, where it is exceeded in limit by the yellow line, which in turn is the next largest field, except above, where it is surpassed in extent by the red field. In the *left eye* there is a distinct contraction of the form-field especially above, contraction, but natural position of the blue field, while the red and yellow

lines cross each other in such a way that in all meridians the red is the greater in extent except directly below. In both eyes the green field, much contracted, occupies its natural position in the sequence of the colors.

CASE VI. *Hysterical swelling; paresis and incomplete anæsthesia of the left arm; normal visual fields.*—Hospital patient (service of Dr. S. Weir Mitchell), aged twenty-eight, teacher. Has had no injury or disease capable of producing serious consequences. Previous to May, 1886, she appeared perfectly well, but was over-worked and had some worry. She began to notice that she was physically feebler than she had been, but she continued at her work. By degrees she became insomnic, waking early in the morning. She complained of some pain in the back, and gave up work in May, 1886. She continued to take care of herself without doing any work during the summer. She still suffered a great deal in the back of her head and neck, and with a painful spine, all of which troubles were increased by fatigue and excitement. In October, she observed that at her periods the right arm began to swell. Soon after it was found to be always swollen. In February, she ceased to be able to write, and every motion increased the swelling. At this time there began a sensation of burning in the arm, although it was cool to the touch, and this was increased by use. The arm at present seems to vary very much in size. (See Table I.) All excitement or emotion is felt in the arm, and she insists that all shocks are felt in that member, or, as she says, "go to the arm." In obedience to the law which seems to control this form of œdema it varies greatly; sometimes the swelling does not extend above the elbow, and sometimes it reaches to the shoulder. Undoubtedly, at her worst, the right leg is affected as well. The right breast is certainly smaller than the left at all times. At seven inches above the wrist the right arm measures eight inches in circumference, and the left seven and a half inches. For the right hand the dynamometer registered 25 and the left 25, but she says the right hand used to be twice as strong. K.-J. + + on both sides; reinforcement normal on both sides. On the right side, however, there is a faint attempt at clonus, the foot moving three or four times and then coming to a pause. The arm muscles and elbow-jerk are normal.

TABLE I.—MEASUREMENTS OF WRIST, MIDDLE, AND UPPER FOREARM, IN INCHES, BEFORE AND AFTER MENSTRUAL PERIOD.

	Wrist.	Middle forearm.	Upper forearm.
March 7. Day before menses appeared,	6¼	7½	9
During this period she suffered unusually.			
March 13. Third day after cessation of flow,	6¼	7	8¾
March 16	6¾	7¼	8¾

At this time she went home for a week, and while there wrote a good deal, the arm becoming worse. On her return a careful examination was made as to sensation, which had been neglected at the previous examination. The pain-sense below the elbow was greatly reduced in the right arm, scarcely existing at all. Touch-localization was much less perfect than it should have been. The condition was difficult to state with exactness, as the distribution of the change seemed unequal. Everywhere from the shoulder to the elbow the tissue was difficult to pick up with the finger and thumb. A large part of the swelling was

clearly not œdematous in the sense in which we use that term. A very remarkable change was observed in the temperature of the two hands, which is illustrated by the table appended.

TABLE II.

		Morning.		Evening.	
		R.	L.	R.	L.
February 13.	Hand	...	...	97⅘°	98⅖°
	Arm	...	...	94⅘	96⅖
	Axilla	...	...	98⅘	99
February 14.	Hand	92⅘°	93⅘°	97⅘	97⅘
	Arm	91⅘	95	94⅖	96⅖
	Axilla	98	98	98⅕	98⅕
February 15.	Hand	95⅕	95⅘	95⅗	95⅘
	Arm	95	95⅖	92⅘	94⅖
	Axilla	98	98	97⅗	97⅗
February 16.	Hand	92⅗	93	86	89
	Arm	90⅗	92⅖	90⅗	92⅗
	Axilla	98	98⅖	97	97

In April, 1888, she was reëxamined, and showed no change for the better. Prolonged pressure showed a small pitting indicating a slight amount of œdema. The analgesia in both leg and arm appeared to be increased.

This seemed to be a rather unusual and irregular case, such as was described by Dr. S. Weir Mitchell in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, under "Unilateral Swellings of Hysteria." Although the analgesia did not exist through the whole side, it was still sufficient to make it worth while to study the color-fields.

An examination of the eyes revealed no abnormalities other than a slight hypermetropia with corresponding deficiency in the amplitude of accommodation. There were no manifest insufficiencies of the external eye-muscles. The eye-grounds were healthy, with, perhaps, slight thickening of the fibre layer of the retina surrounding the upper and lower edges of small, vertically oval optic disks. A study of the color-fields made on several different occasions failed to determine any decided abnormality for blue and red. The green field was contracted to a smaller limit than that which is usually considered to be normal, and was smaller in contrast to the extent of the other colors. This was present alike in each eye, the fields of each corresponding in area.

CASE VII. *Epilepsy; hysterical hemiplegia; partial left-sided anæsthesia; contracted visual fields.*—Hospital patient (service of Dr. S. Weir Mitchell), aged twenty-eight years, single, American. Since seventeen years of age she has been subject to fits, sometimes one a week, sometimes many in a day. For a week before the first examination she had none. Hereditation is good; both parents healthy. The cause of the patient's disease is unknown: she has no discoverable disease in any organ. At her menstrual period she has some pain in the iliac region, of which she

sometimes complains in the intervals. When the fit is approaching, she has slight pain in the left arm and the præcordium. This lasts for a few minutes, and may exist without any sequent fit. The onset of the spasm is sudden, and affects first the right face and neck; it then becomes rapidly generalized, and sometimes lasts an hour with brief intervals. Occasionally she has had the lesser epilepsy. The disorder is more frequent in hot weather, occurring every other day. Her treatment does not here concern us, and her history is interesting only because she has had attacks of hysterical hemiplegia.

For some two or three weeks past (May, 1889) she seems to have been more nervous and feeble than usual. She complains of pain in her left chest, and there is also a copious eruption of acne on the left side of the chest due to a belladonna plaster. She has been taking twenty grains of bromide three times a day, with arsenic, for two or three months. Increasing nervousness marked the near approach of an attack, which took place May 15th. She had been annoyed and troubled for some days by a variety of matters. While sitting at dinner she found great difficulty in moving her left hand, and felt her face turned slightly to that side, with a sense of tingling at her fingers' ends. Within an hour this developed into moderate chilliness on the whole left side. Neither the speech nor the power of swallowing was affected. Since then she has gradually become better, but still there is very little gain of strength. The dynamometer shows 35 for the left side, and 48 for the right. A sensory examination in this case of the paretic condition is important. Portions of the left side, of the left face, and the fingers of the left hand were slightly altered as to touch, but not enough to enable us to detect any difference by the points of the compasses. As to pain, there was a different state of things. The whole left side was rather less susceptible to pain, even when pain was felt. In the right side, in the right arm and right leg below the knee there was insensibility to the prick of a needle. But here, as in other cases, a sense of pain, which seemed almost extinguished at a number of points, could be made active with the aid of a strong faradic current, if the conductors were dry and uncovered. It is to be observed that in some places insensibility was perfect in a limited area for an inch or two in diameter, but just outside the line sensation was again distinct. Also, it appeared in this case, as in many others, these pain-areas would continue to move. For instance, pain-sense would exist in a given area, and in half an hour that portion of the body would be again insensible. She had, as is usual in persons in this state, a sensitive region on the left side of the abdomen, a soreness which is popularly attributed to sensitive ovaries, but in the present case far too extensive to allow any such explanation.

A study of the eyes showed central vision very defective owing to the presence of a high degree of compound hypermetropic astigmatism associated with manifest convergent strabismus, the left eye being more amblyopic than its fellow. The optic disks were oval, sharply excavated, distinctly waxy in their deeper layers, and the retinas hazy and full of lymph reflexes. The fields of vision for form and color were concentrically contracted about ten degrees in all meridians, but there was no reversal in the order of the colors, nor crossing of the lines, nor reëntering angles, nor peripheral scotomata.

Case VIII. *Right hysterical hemi-anæsthesia; partial left anæsthesia; reversal in order of color-fields.*—Hospital patient (service of Dr. Wharton

Sinkler), aged thirty; single; Irish servant; family history good; menstruated at thirteen and since irregularly; previous history ordinary. Four years ago she experienced loss of power in the right foot, which became worse on exertion, however slight. The disability travelled upward, involving gradually the foot, the side, and the arm. A numb feeling now affects the leg and back. There are sharp pains along the side of the leg. She says she cannot sit up in bed; but, when ordered to do so, obeys without trouble. There is some twitching of the thigh at night. She walks badly, dragging the right foot. Patellar reflexes + on both sides; reinforcements not obtainable. Repeated blows easily produce very rapid contractions. Elbow-jerk normal on the left side, less than normal on the right. Dynamometer (Burq)—right, 6; left, 27. There is an attempt at ankle clonus (?). Sensation much worse on right side. She distinguishes touch, but cannot differentiate the head from the point of a pin in the right arm, hand, and shoulder. On the right chest and neck she recognizes the point, but not pain. Sensation is less, diminished in the right leg than in the right arm, but it is also analgesic. The left side is also analgesic, but distinguishes head and point. There is no pain on pressure over the nerve trunks.

Globus hystericus is nearly constant.

Heart and lungs normal.

An examination of the eyes elicited the following points: The vision was equal in each eye—two-thirds of normal—the slight deficiency being due to a low grade of myopic astigmatism. The pupils were small, round, and normal in their reactions. The pupillary distance was unusually wide, 68 mm. The fields of vision were found in the following order:

	Outward.	Upward.	Inward.	Downward.
Right Eye.				
White	80	38	40	60
Red	25	10	20	15
Yellow	25	10	18	10
Green	18	8	12	7
Blue	5	5	8	5
Left Eye.				
White	80	35	40	25
Red	30	12	20	18
Yellow	30	10	18	18
Blue	15	5	10	8
Green	5	5	10	5

From an examination of these numbers it will be seen that in the right eye the red field occupied the greatest area, next and about equal to it was the yellow, then the green, while the narrowest was the blue which, greatly contracted, surrounded the fixation-point. In the left eye the same conditions obtained, except that the green field was in all meridians smaller than the blue, except upward and inward, where it was equal to it in extent. The white field in each eye was much restricted. The optic nerves were oval; in the right eye the color a dirty gray with a sharply marked scleral ring; in the left eye the same gray color in the

temporal half with a brick-dust hue of the nasal side, and similar sharp marking of the scleral ring. The central vessels were unchanged.

It is evident from an examination of these cases that in no instance was there loss of the color-sense, the achromatopsia of Galezowski, nor was there any disappearance of the colors in a constant order. In the two cases of complete anæsthesia there was no departure from the normal sequence of the colors; and, practically, no limitation in the area of the field of the one (Case I.), and but slight restriction in the other (Case II.).

In the cases of partial anæsthesia, in one (Case VI.) no abnormality for blue and red existed; green was by contrast contracted, and in two others (Cases III. and IV.) there was concentric irregular contraction of the color-fields; but in all three the normal sequence of the colors was undisturbed.

In two cases (IV. and V.), while the colors were correctly appreciated, their natural order was changed, the blue, red, and yellow lines crossing each other in such a manner that the red field became in some meridians the greatest in extent.

In only one case (Case VIII.) was there an approach to complete transposition of the colors so that the red became the largest field, followed by yellow, green, and blue. In none of the cases was marked amblyopia present, except in Case VII.; here the deficiency in visual acuity was due to a high grade of hypermetropic astigmatism and concomitant convergent squint.

We have had the opportunity of studying two cases of absolute hysterical hemianæsthesia, presenting the phenomena of crossed amblyopia. In one, a woman aged twenty-five years, seen by the courtesy of Dr. H. C. Wood, these symptoms appeared several months after the shock of a railroad accident. There was complete right-sided hemianæsthesia and loss of the special senses on the anæsthetic side, with amblyopia in so high a degree that quantitative light-perception was absent. The vision of the left eye was reduced to one-ninth of normal; red was the only color correctly appreciated, and there was left lateral hemianopsia.

In the other case, examined by the kindness of Dr. G. Oram Ring, who will publish the notes in detail, precisely the same conditions obtained, except that the amblyopia was less marked upon the anæsthetic side. In both of these cases the ophthalmoscopic appearances were normal.

If, as may fairly be supposed, these eight cases, taken at random from a large service, represent the ordinary conditions, then our conclusions as to the occurrence of achromatopsia with hemianæsthesia must be very different from those of the European observers. The patients were selected for study because they all presented greater or less degrees of loss or change of sensibility. As to this, it should be said that we can-

not find any statement by the French writers, who are the original students of this subject, concerning the relative frequency of hemianæsthesia in all hysterical cases, except statements like that of Dr. Bernutz, already quoted, that it is "one of the primordial symptoms," or Charcot's remark in exactly the same sense,[1] which would imply that it was present as an almost constant characteristic. Further, as to generalized anæsthesia, or, more properly, analgesia, Bernutz calls it "infinitely rare," and Charcot "relatively exceptional." The results of the ward-service as well as of the out-patient department of the Infirmary for Nervous Diseases would not allow us to make assertions which should corroborate these. These services may, we think, be considered to represent well at least the Eastern United States, as patients come from all of them to seek treatment, and our eight quoted cases are natives of several States—Pennsylvania, Wisconsin, New York, Virginia, and New Jersey. Every case differs in the *quality*, too, of the sense-changes, and some have that very curious symptom of ability to feel heat, when great, as pain, while they cannot appreciate a needle-thrust.

The only general conclusions which it does seem possible to draw are that general anæsthesia, infrequent though it be, cannot for this country be supposed so rare as in Europe; on the other hand, complete or nearly complete unilateral anæsthesia, while commonly present, is yet by no means so constant a feature of ordinary hysterical cases with us as with these foreign authors, and when either of these states is a symptom, it is certain that changes in the perception of colors are far less often to be found accompanying them than the study of the French and German writers would lead us to expect, and are practically absent in the cases of complete anæsthesia. Just as these observers see more often than we grave hysteria with convulsive seizures, hysteria, in the male and hystero-epilepsy, so it would seem they find hemianæsthesia with achromatopsia more common. Some of their facts, as that mentioned by Landolt of the frequency of concentric contraction of the fields in such states, are as true for this country as for Europe.[2]

[1] Leçons sur les Localisations, etc., L. x. "In hysteria we have to do . . . with a unilateral anæsthesia. Total anæsthesia appears in relatively exceptional cases."

[2] Quoted by Charcot. See also the observations of Moravcsik in Laufenauer's clinic at Buda-Pest. Centralbl. f. Nervenheilkunde, 1887, p. 301.

THE USE OF OXYGEN IN THE TREATMENT OF LEUKÆMIA AND GRAVE ANÆMIAS.

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AND

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The treatment of the more serious forms of blood diseases is still so unsatisfactory that any addition to our means of counteracting them is deserving of record and careful scrutiny, and we offer these observations in the hope that others will be induced to try what we have found to be a potent agent. The changes in the blood in the cases observed were followed out in every detail, and the conclusions rest, therefore, not on impressions, but on actual minute inspection of the blood corpuscles.

Case I.—G. B., æt. thirteen, had been subject to attacks of jaundice from infancy; the mother states that she believes the child had a number of malarial seizures, but was not certain. When first seen (February 5, 1889), the patient was pale, the conjunctivæ pearly and somewhat jaundiced. The spleen was enlarged, extending from the eighth rib to four finger-breadths below the margin of the ribs. The tumor had been noticeable for a year previous. For nearly two years the patient had spells of weakness, extending over a period of three weeks, and at intervals of two to three months. Occasionally hemorrhages from the nose occurred during this time, but never sufficient to cause alarm. His strength gradually failed, and he was discharged from his position as cash boy in a dry goods house, being unable to stand the work.

When first seen, the blood was examined and found to contain a sufficient excess of white corpuscles to warrant the diagnosis of splenic leukæmia. This view was substantiated by the fact of the white corpuscles steadily increasing in number, while the red diminished. February 5, 1889: The red numbered 2,350,000, the white 105,000 to the c.mm.; by May 20th the white corpuscles had increased to 320,000.

Having been on arsenic sometime previous to his first visit, the patient was given Basham's mixture and three grains of the extract of ergot three times daily, without, however, producing any effect upon the spleen. Galvanism was tried over the splenic region for two months without any improvement. Trinitrine was given at the same time, but the patient grew weaker under this treatment, and arsenic was again resorted to, though without amelioration.

On June 1st he began to inhale oxygen, and he improved rapidly under the treatment. He was given daily from twenty to thirty litres of oxygen, which was continued until August 5th. At this time the boy returned to work, much better than when he had left it. The blood was again examined September 2d, and found to be so near the normal that a count of the white corpuscles was considered unnecessary, the red being increased to 4,850,000, and one white found to about every four hundred red. The oxygen treatment was stopped.

Unfortunately, in this case, the early history could not be accurately determined; the mother's statements being very conflicting. But the great improvement spoke for itself—the boy is now steadily at work, and there is reduction even in the size of the spleen. The area of dulness begins fully one inch lower and one inch further to the left of the median line than when first seen.

The following case gives us a clear history; the patient being a man of intelligence and one who takes as much interest in the details of his case as those attending him:

Case II.—S. L., æt. thirty-five; a man largely engaged in mining operations. Up to fifteen years of age he had enjoyed good health. The family history is excellent. In 1869, he lived in Iowa on the banks of the Mississippi River, a highly miasmatic region. Three years later, at the age of eighteen, he had an attack of malaria; the case was a severe one, lasting over a period of two years, during which time he was seldom free from the symptoms of the disease, and never escaped longer than one month without being confined to his bed. In 1874, he moved to a district among the Rocky Mountains, where he was entirely free from the outbreaks. Two years later, he had typhoid fever which confined him to his house for nine weeks. The convalescence was slow. In 1879, he had an attack of erysipelas lasting six weeks; convalescence here, too, was slow. Up to this time the patient had never weighed more than one hundred and fifty pounds; in the spring of 1880 he began rapidly increasing in weight, reaching, in a period of six months, two hundred and twenty pounds.

Although, for two years, at this period of life, the patient claims to have been in the best of health, a slight pallor of the skin was always present. He enjoyed, however, but two years of absolute freedom from ailment; for, in the spring of 1883, while suffering from jaundice, he began to lose flesh rapidly; in one month his weight was reduced to one hundred and ninety pounds. In the summer of the same year he had hemorrhages from the nose, the attacks lasting twenty-one days. The hemorrhages occurred daily, and were uncontrollable by any means other than plugging the nostrils; large doses of ergot and gallic acid were administered. After the hemorrhages ceased, his weight had diminished to one hundred and forty-four pounds.

In the autumn of 1883, a physician in Denver found that the spleen was enlarged; no examination of the blood, however, was made, and he was treated for "ague cake." Soon after this the patient went to Boston, where he had another attack of hemorrhage, lasting ten days. Up to this time he had gained ten pounds, but was soon reduced to one hundred and forty pounds. A trip to Europe was recommended, and there the patient in four months' time gained forty-four pounds. After leaving Europe he gradually lost weight. No hemorrhages have since occurred.

Since 1883 he had always suffered the inconvenience of an unquenchable thirst, the amount of liquids drunk being enormous—as high as twenty pitchers of ice water in the twenty-four hours; besides this, he imbibed a large amount of champagne, brandy, and other drinks. Concerning the early habits of the patient, they were anything but favorable to the success of any treatment. From the age of eighteen he had been

a heavy drinker, though never to intoxication; by his own statement he has taken in a day, without any effect other than exhilaration, two quarts of brandy, besides beer and wine. He has always been an inveterate smoker, and even at the present time does not find it easy to smoke less than nine cigars a day. Though a specific history in the case cannot be positively asserted as being negative, yet there have never been any symptoms of secondary infection.

Early in September the patient came to Philadelphia for treatment. When first seen he suffered from intense thirst and frequent micturition, passing large quantities of water, containing neither albumin nor sugar. The spleen was enormous; it passed nearly two inches beyond the umbilicus. There were profuse diarrhœa and great emaciation. Ergotine gr. ij t. d. was prescribed, followed by tartrate of iron and potassium, and that by the sulphate of iron. The ergot was continued more or less throughout the month of September, and, obeying strict directions, the stimulus was reduced to very moderate amounts. During this time the diabetes insipidus disappeared, and the patient drank but a pint of water in the twenty-four hours; the diarrhœa was arrested.

September 24th. Arsenite of soda, in gr. $\frac{1}{40}$ doses, was prescribed. Soon after this the patient went of his own accord to Hot Springs, Arkansas, but was advised there to return to Philadelphia, his case being considered non-specific. While at the Hot Springs he took the iodide of potassium gr. xv, t. d. This was continued until December 9th, being stopped on account of gastric irritation. At this time the spleen was outlined and found to extend an inch and a half to the right of the median line, and to fill completely the left abdominal cavity—from the lower border of the seventh rib above to the lower border in a line with Poupart's ligament. The blood contained 3,400,000 red and 62,000 white corpuscles to the c. mm.; hæmoglobin 60 per cent.

There was some improvement under the use of arsenic and Basham's mixture. But January 10th the patient was worse. Arsenite of soda, in doses from $\frac{1}{80}$ to $\frac{1}{60}$ of a grain, was taken at irregular intervals until June 27th, when it was discontinued, and the oxygen treatment begun. An examination of the blood at this time showed that the red corpuscles had diminished to 1,440,000, the leucocytes had increased to 1,120,000, a proportion of as $1 : 1\frac{1}{5}$. The patient had been in the West three months previous to this time. When he returned to Philadelphia it was found that the character of the disease had assumed a most serious type. His appearance was striking. The veins of the forehead were largely distended, and the capillaries plainly visible in many parts of the face, most prominent on the nose. The spleen was as large as ever, the abdomen greatly distended and tense, assuming a spherical shape. The knees were shaky; the feet were swollen, the swelling extending up as far as the knees. Shortness of breath was produced upon the slightest exertion; he always felt extreme fatigue. The spinal column was tender to the touch; the sitting posture produced severe pain in the bones of the ilium. A distinct anæmic murmur was heard over the base of the heart. Profuse watery discharges from the bowels had set in four days before his return, and still continued. He reported that he had been feverish for weeks, his temperature at that time (June 26th) being 102.3°; he was much depressed in spirits. He stated that, having himself made a careful study of the disease, he knew there was not the slightest hope for him. He was willing and

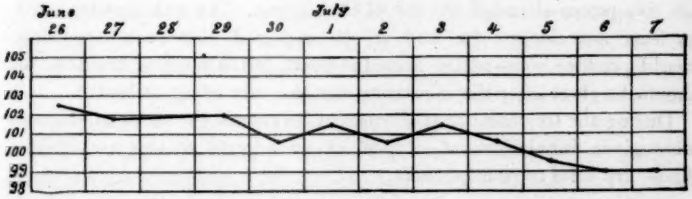
anxious that an experienced surgeon should attempt to remove the spleen, knowing that his chances were of the very slightest.

Beside the condition of the blood in regard to the relation of the corpuscles, it might be of interest to add that its color was opaque, it flowed freely from the puncture made by the lancet, and coagulated very slowly. Microscopically, the red blood-corpuscles were found to be widely separated, extremely pale, and at no time formed in rouleaux. The leucocytes varied in size and shape; some were small, others of enormous size, fully the one-five-hundredth of an inch in diameter; many were crescent-shaped as well as large, while others were shapeless.

After two days' inhalations of oxygen, the character of the blood was entirely changed; observed on the glass slide, the large and misshapen leucocytes had entirely disappeared, the red corpuscles formed rapidly in rouleaux, and the blood showed no abnormal character other than the relation of the white and red corpuscles.

From June 27th to July 3d the patient took nothing beside the oxygen, except a mild hypnotic upon retiring. Ten litres, three times a day, were inhaled. The oxygen was perfectly pure, and was allowed to pass through water, to prevent dryness of the throat. The effect at the end of the week was marked; the swelling of the feet was scarcely perceptible; the appetite was good; the bone pains had almost entirely disappeared; the temperature had steadily fallen, and the patient walked about with comparative ease. The number of white corpuscles had diminished nearly one-half, while the red had gained a million. During the second week the patient was given Basham's mixture, but it did not suit him, and at the end of the week it was discontinued. In the third week of the treatment the most marked improvement took place in the general condition. The fever disappeared entirely; there was no swelling of the feet; the prominent veins on the forehead and the capillaries visible on the face had almost completely passed from view; the appetite increased; there was shortness of breath only on violent exertion, and the patient was but little inconvenienced by walking a mile. By the end of the fourth week he had gained nine pounds.

CHART.



Temperature from Wednesday, June 26, to July 7, 1889. Oxygen commenced in the morning of July 27th. Temperature taken 3 P. M. After July 7th the thermometer at no time registered over 100°.

From this time the improvement was steady until August 20th, when, by some indiscretion in diet, aided greatly by a few bottles of champagne, together with the atmosphere of Boston, which did not suit him, he began to fail. The white corpuscles increased in number, the red slightly diminished.

August 26th, he returned to Philadelphia, since which time he has rapidly gained in strength, and is now on a visit in Colorado, having stood the trip very well. Not long before he left, the spleen was carefully percussed, and presented a marked reduction in size, the transverse diameter extending only to three-quarters of an inch of the median line near the umbilicus. A telegram from Denver of September 20th records: spleen going down, blood in excellent condition, hæmoglobin up, appetite excellent.

An ophthalmological examination made August 29th, by Dr. Gould, showed a noteworthy absence of several of the typical signs of leucæmic retinitis as described by Liebreich, Becker, Leber, and others. Dr. Gould regretted that he had no opportunity to make an examination at an earlier stage of the disease when the proportions of the red and white corpuscles were so abnormal. There is in both eyes a grayish haze that suffuses the central part of the fundus, especially about the papilla, in semi-obscurity. This gradually clears until at about 50° the details of the periphery are normally clear. But this discoloration is not yellow, nor has it an orange tint. The veins are highly distended and engorged, but only slightly tortuous; the arteries of subnormal size, often thread-like; the light-streaks of the centre well preserved; the color of the blood is pale, but not excessively so. No white bands of extravasated corpuscles follow the vessels, and the white dots or splotches usually described are not to be seen about the macula or periphery, and no remains of hemorrhages are to be found. The existence of a typical tobacco papilla is very noticeable. The visual acuity is good, full $\frac{20}{xx}$ with either eye, despite a slight hyperopic astigmatism.

During the course of treatment the oxygen was steadily increased to sixty litres in the twenty-four hours, and now one hundred litres a day are inhaled; the patient having sent by express nearly a thousand gallons to Colorado. It was at first thought best to administer the oxygen so that it be taken at three sittings, this was changed to two sittings in the twenty-four hours. Throughout the treatment no unpleasant symptoms attended the use of the oxygen. An exhilarating effect, at least, was looked for, and it was expected that such large doses would produce some action upon the heart, but a sense of freedom felt about the chest after the inhalation was the only effect noticed.

During the treatment of these cases of leukæmia, two cases of chlorosis were given inhalations of oxygen, as an adjunct to the use of iron. These are brief records of them.

CASE III.—A. M., æt. seventeen, school-girl. In the early spring she began to feel weak, and suffered considerably from headache. Her menses at that time were scant, and disappeared entirely during the months of April and May. For six months previous to this she had been pale. On June 8th, the patient was extremely pale, the conjunctivæ pearly, there was but little color to the lips. The blood was examined, and found to contain but 25 per cent. of hæmoglobin, the red blood-corpuscles numbering 3,800,000 to the c. mm.; white corpuscles one to every four hundred and eighty red. The sulphate of iron in

increasing doses was prescribed, with daily inhalations of from twenty to thirty litres of oxygen. In two weeks time there was marked improvement. June 24th the menses reappeared, though scant.

By July 1st her color had returned. An examination of the blood showed the hæmoglobin to be 90 per cent., the red corpuscles numbering 4,850,000 to the c. mm. White corpuscles one to every six hundred red.

Case IV.—R. E., æt. twenty-three, teacher. Menses irregular and scant for a number of months. She suffered much from headache. For the past three months she has been very pale. There was considerable shortness of breath. A large eczematous patch covered most of the chin. Examination of the blood showed the hæmoglobin to be but 30 per cent. of the normal, the red corpuscles numbering 5,000,000 and the white normal. She was given the sulphate of iron in increasing doses, and inhalations of from twenty to thirty litres of oxygen a day. To the eczema an ointment of ten grains of resorcine to an ounce of ointment of oxide of zinc, was applied at night. July 24th, the general health was much improved, and the hæmoglobin found to be 45 per cent. The iron pills and the oxygen were continued.

August 2d. Menses were about normal, the hæmoglobin 60 per cent. The patient was again seen August 28th. She had discontinued the oxygen on August 8th, and took no medicine after August 12th, the eczematous patch having disappeared. She was still somewhat pale; the hæmoglobin was found to be 75 per cent. The pills were renewed, oxygen was resumed, and pepsine and hydrochloric acid were taken after meals. September 8th, her color was normal and the hæmoglobin found to be 90 per cent., the patient feeling strong and hearty.

Of the value of the oxygen in these severe cases of anæmia there can be no doubt, though they were of a character in which it is likely that other treatment long persisted in would also have been beneficial. But certainly a curative effect would not so soon have been accomplished without the oxygen. With these results in mind, it is natural that we should have been anxiously waiting to observe its effects in a case of undoubted pernicious anæmia. Such a case is now in our hands, in which the first examination showed only 900,000 red corpuscles, and the second, in about a week afterward, 700,000; the hæmoglobin at both being 25 per cent. The patient is weak to the verge of utter exhaustion. We have begun the oxygen treatment, but have not as yet used it long enough to judge of its merits.

But to return to what we have been studying in the first group of cases—to the leukæmic condition and the changes wrought in it. That these were made through altering the blood seems certain. With its alteration, the nervous system recovered from its depressions, the mind improved, flesh and strength were gained, the secretions became healthier, and all this took place rapidly, and in cases in which iron and arsenic had failed to stay the downward course. The effect on the spleen was less evident, for the organ, though decreased, remained very large in both.

It may be of interest to compare the results of the treatment with

some instances of the disease in which blood counts were made while other remedies were employed. In Mr. Barton's well-known case,[1] in which for four months large doses of arsenic were taken, the dose reaching twenty-five minims of the liquor arsenicalis six times a day, there was a most striking improvement. The white corpuscles were greatly reduced, but there was but little increase in the red. We have made blood counts in cases treated with phosphorus, and in cases treated with arsenic. In one with phosphorus persisted in for three weeks in decided doses, two observations on the blood showed no improvement, and the patient was lost sight of. Arsenic we have often employed and made frequent examinations of the blood during its use. We append one followed to the end, drawn up for convenience' sake in tabular form.

THE CASE OF H. R., TREATED MAINLY BY ARSENIC.

	Number of red corpuscles to the c.mm.	Number of white corpuscles to the c.mm.	Per cent. of hæmoglobin.	The proportion of red to white corpuscles.
June 12, 1888.	2,830,000	145,000	40	1 : 20
" 26,	2,800,000	103,200	40	1 : 27
July 9,	2,915,000	108,000	45	1 : 27
" 16,	2,500,000	95,000	30	1 : 25
" 30,	2,405,000	90,000	35	1 : 27
Aug. 12,	2,365,000	205,000	20	1 : 11+
" 21,	2,160,000	300,000	30	1 : 7+
" 30,	2,050,000	368,000	25	1 : 5+
Sept. 15,	1,950,000	400,000	25	1 : 4+
" 25,	1,760,000	950,000	20	1 : 1+
Oct. 18,	1,570,000	1,000,000	20	1 : 1+
" 29,	1,240,000	1,938,000	15	1 : 0.5+
Nov. 5,	1,120,000	2,560,000	10	1 : 0.5

The following shows the line of treatment in the case of H. R.:

June 12th to July 1st. Quinine sulph. grs. v, t. d., ext. of ergot. grs. v, t. d.

July 1st to Sept. 26th. Stomach irritable. Ergot discontinued, liq. Fowleri ♏ iv, increased gradually to ♏ xx, t. d., discontinued only when stomach became irritable.

The patient died November 29, 1888. Post-mortem examination: Spleen weighed eight pounds, the liver six and a half. Kidneys contracted. Inflamed condition of the alimentary canal and peritoneum. Mesenteric glands enlarged. Fatty and dilated heart. Pleural adhesions. Slight broncho-pneumonia. Anasarca.

For purposes of comparison we append, at the risk of some repetition, the results in tabular form, with reference to the blood and its change by the oxygen treatment, in the two cases of leukæmia detailed at the beginning of the paper. The increase of red as well as the diminution of the white corpuscles is very obvious.

[1] Year-book of Treatment, 1889.

THE CASE OF G. B., SHOWING THE RELATION OF THE RED AND WHITE CORPUSCLES BEFORE AND AFTER THE INHALATIONS OF OXYGEN.

	Number of red corpuscles to the c.mm.	Number of white corpuscles to the c.mm.	Per cent. of hæmoglobin.	The proportion of red to white corpuscles.
Feb. 5, 1889.	2,350,000	105,000	20	1 : 22
April 10,	2,860,000	120,000	25	1 : 24
May 12,	2,650,000	300,000	20	1 : 8
" 20,	2,550,000	320,000	15	1 : 8
June 10,	3,000,000	165,000	20	1 : 12
" 23,	2,675,000	160,000	—	1 : 16
" 28,	3,500,000	17,500	—	1 : 200
July 5,	3,800,000	17,277	30	1 : 220
" 10,	4,000,000	10,650	—	1 : 380
" 16,	4,300,000	13,300	45	1 : 323
" 29,	4,520,000	14,000	65	1 : 323
Sept. 1,	4,850,000	——	—	1 : 400

The following shows the line of treatment in the case of G. B.:

February 5th to 23d. Basham's mix. ℥ss, t. d.; ext. of ergot. grs. iij, t. d.

February 23d to May 25th. Trinitrine gtt. i–v, t. d.; quinine grs. iij, t. d.; galvanism.

June 1st to July 29th. From 20 to 30 litres of oxygen a day; no other treatment.

During the month of August the sulphate of iron was prescribed.

THE CASE OF S. L., SHOWING THE RELATION OF THE RED AND WHITE CORPUSCLES BEFORE AND AFTER THE INHALATIONS OF OXYGEN.

	Number of red corpuscles to the c.mm.	Number of white corpuscles to the c.mm.	Per cent. of hæmoglobin.	The proportion of red to white corpuscles.
Dec. 9, 1888.	3,600,000	65,000	70	1 : 55
Jan. 5, 1889.	3,200,000	200,000	60	1 : 16
Feb. 5,	2,600,000	450,000	45	1 : 5⅞
June 26,	1,440,000	1,120,000	25	1 : 1¼
July 3,	2,408,000	584,000	35	1 : 4⅛
" 10,	2,140,000	560,000	35	1 : 4
" 17,	2,292,000	358,000	40	1 : 6½
" 24,	2,484,000	320,000	—	1 : 8
" 31,	2,792,680	167,320	—	1 : 17+
Aug. 18,	4,614,200	165,800	60	1 : 30
" 27,	3,440,000	320,000	—	1 : 14
Sept. 1,	4,658,000	142,000	65	1 : 32+

The following is the treatment carried out in the case of S. L.:

Dec. 9, 1888, to Jan. 5, 1889. Potassium iod. grs. xv, t. d.; sulphate of iron.

Jan. 10th to June 26th. Arsenite of soda gr. $\frac{1}{40}$–$\frac{1}{25}$, t. d.; iron discontinued.

June 27th to July 3d. 30 litres oxygen daily.

July 3d to 10th. 45 litres oxygen daily; Basham's mix. ℥ss, t. d.

July 10th to Aug. 14th. 54 litres oxygen daily.

Aug. 14th to 22d. 54 litres oxygen daily; sod. arsenite gr. $\frac{1}{30}$, t. d.

Aug. 22d to Sept. 1st. 60 litres oxygen daily; arsenic discontinued.

After Sept. 1st. 100 litres oxygen daily.

We are not aware that oxygen has been systematically used in serious blood affections. The only case of its employ we can find recorded is the one of leukæmia reported by Sticker.[1] The examination of blood showed the red corpuscles decreased to 30 per cent., the white corpuscles numbering 3,735,000; a proportion of white to red of 1:0.5. From May 5th to August 22d the patient took daily inhalations of oxygen, commencing with thirty litres, which was finally increased to sixty litres a day. August 22d the red corpuscles numbered 4,460,000, the white 33,200; the patient, after a relapse in which the administration of oxygen had no effect, died the following January.

The mode of action of oxygen is not fully known. We have here a field in which the therapeutic powers of this gas may be, by continued observation, ascertained. Sticker has suggested that the white corpuscles absorb oxygen, and use it up in the blood, and this at the expense of the red corpuscles, and that the administration of the gas might be expected to restore the normal condition, as well as to aid in the conversion of white into red corpuscles.

In all cases of leukæmia there is always found an impairment of some one or more of the blood-making organs, due at times to a known cause, at others to an unknown one. In Case II. the history is that of decided disease of the spleen, long before the blood became markedly affected. It was not until the functioning power of the spleen was seriously diminished that the blood gave signs of leukæmia, and as it became more and more impaired by the overgrowth and distention of the diseased organ, the red corpuscles diminished and the white increased. We had then, it seems, in the action of oxygen, a substitution for the function of the spleen. We did in both these cases, artificially, what the damaged organ could not perform—we allowed the metamorphosis of the white corpuscles into red to go on. The hope in benefiting the patient is to keep up this substitution until the lesion is influenced by the improved nutrition, aided by other means; or, in appropriate cases, until the system is so far built up to make surgical interference a procedure much more likely to succeed than it does now. Whether permanent effects follow this oxygen treatment, or mere temporary benefit and prolongation of life, we cannot as yet say. In cases in which the structural changes are still slight, we believe the remedy may bring about a permanent change; in more advanced cases this is more doubtful. But, under any circumstances, that it prolongs life and produces results not to be otherwise obtained, our experience enables us to affirm.

[1] Beiträge zur Pathologie und Therapie der Leukæmia. Zeitschr. f. klin. Med., Bd. 14, Heft. 1, 2, 1888.

SOME MANIFESTATIONS OF LITHÆMIA IN THE UPPER AIR-PASSAGES.[1]

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The influence of lithæmia and allied conditions upon the mucous membrane of the upper air-passages appears in a general way to be recognized by the profession, but an examination of the *Index-Catalogue* of the Surgeon-General's Library fails to show any indication of this recognition by title or reference. Harrison Allen,[2] in the past year, has reported five cases of gouty sore throat, with a description of the general characteristics of such cases. His brief *résumé* of the literature extant upon the subject shows that it has received slight consideration in laryngology. That the existence of an influence so obvious in its effects upon the upper air-passages in a limited class of cases should have escaped more detailed description in laryngological text-books and in current literature, is apparently due to the great advance made in recent years in improved methods of topical application and to the increased interest in nasal surgical pathology and the greater appreciation of its influence upon laryngeal disease, which have led to a, perhaps, too strictly local and surgical view of some diseased conditions of this region.

In addition to the sore throat found in distinctly gouty subjects, described by Allen,[3] there is a less well-defined form of inflammation—of which his second case appears to be an example—that presents certain appearances and symptoms, which, while not at all pathognomonic, yet taken with the history and general symptoms, and above all with the results of general therapeusis, are indicative of its dependence upon a lithæmic or allied condition. These local manifestations of lithæmia are of necessity not clearly definable, for the general condition upon which they supervene is one of whose underlying pathological conditions we know but little. The term lithæmia, tentative in character, is based solely upon clinical manifestations and is applied with considerable latitude of meaning. Some even speak of an acute so-called "bilious attack" as an attack of lithæmia. The term is here used to express the now well-recognized conditions to which Murchison[4] applied the name—not to conditions brought about in an individual with fairly normal digestive and assimilative functions by temporary excess, or even by constant irregularities of diet of a gross character, but to that condition of suboxidation and overcharging of the blood and excretions with excretory matter in a state of faulty elaboration due to inherent and hereditary abnormality of function or to prolonged exposure to depress-

[1] Read before the eleventh annual Congress of the American Laryngological Association, 1889.

[2] Medical News, June 16, 1888.

[3] Loc. cit.

[4] Clinical Lectures on Diseases of the Liver.

ing environment. As S. Solis-Cohen well says in a recent article on the "Therapeutics of the Gouty Diathesis:"[1] "It is not a disease—not a sudden or gradual departure from the usually normal action of the organism—that we are dealing with; but it is, if I may be permitted the expression, an abnormal normality; that is to say, an inherent departure of the individual organism from the typical action of like organisms."

Individuals of this diathesis are prone to digestive disturbance from the most ordinary articles of diet, particularly the starches and sugars and acid fruits. Simple and regular habits of diet are not sufficient to prevent recurring exacerbations of the characteristic symptoms, if unusual mental or nervous strain is undergone in a sedentary pursuit. There is the tendency to form uric acid in excess, from which the condition is named, and to a waste of phosphates—conditions most easily detected in the urine—along with digestive, mental, and nervous phenomena of depression familiar to you all. While this condition is found in individuals of gouty antecedents, or of distinctly gouty tendencies, so that the term lithæmia or the gouty diathesis may be used interchangeably to describe it in some cases, yet in other cases its subjects may never have true gout, or even distinct irregular manifestations of it. Indeed, under the environment of most Americans, the development of local attacks of gout is rare, while the nervous and digestive derangements under consideration are not unusual. From this it appears that a distinction must be drawn, as pointed out by Allen,[2] between cases of gouty sore throat—where the throat lesions accompany or follow distinctly local manifestations of gout in other parts of the body—and cases in which with no distinct personal or family history of gout, there are throat symptoms referable to a general lithæmic or allied condition, and relieved by treatment directed against such condition.

I have qualified with the words "or allied condition" the definition of these cases as lithæmic, because the term is of necessity somewhat vague and elastic in its application to conditions that vary from typical and unmistakable clinical manifestations to almost normal health. It includes many cases of "muscular rheumatism," so-called, and the tendency to the affections of fibrous structures seen in sufferers from torticollis, lumbago, etc., is more allied to lithiasis than to the acute affection from which it borrows its name. The same may be said of certain forms of chronic rheumatic sore throat described by Ingals.[3] Some of his cases appear to me as expressions of a lithic rather than a true rheumatic state.

The manifestations of lithæmia in the upper air-passages do not fall uniformly under any one type, nor are they sharply distinguished as being of lithæmic origin by the local conditions they present; but there are certain appearances or symptoms that are more or less constantly

[1] Medical News, May 18, 1889.
[2] Loc cit.
[3] Amer. Journ. Med. Sci., Jan. 1888.

connected with lithiasis, and at least suggest the presence of that element and the need of general therapeusis on that line, whatever local measures may be indicated.

An appearance occasionally seen in cases of irritable throat associated with lithæmia is a patchy congestion of the laryngeal face of the epiglottis extending along the aryepiglottic folds and over the posterior aspect of the ventricular bands. This is associated with a harsh, dry, explosive cough, and sense of extreme irritation about the larynx. My friend, Dr. Roswell Park, has informed that he has seen with the cystoscope the same patchy congestion of the mucous membrane of the bladder in a case of inflammation of that organ in a markedly lithæmic subject.

A case illustrating this form of laryngitis, associated with lithæmia, is the following:

Male, aged about thirty-eight years, of sedentary habits. Is subject to attacks of constant, irritable, and explosive cough, with some impairment of strength of voice. The attack at time of first consultation had lasted about one week. Laryngoscopic examination showed irregular patches of deep congestion on the margins of the epiglottis and on its laryngeal surface. The upper larynx generally showed more congestion than in the plane of the glottis. Warm aromatic inhalations and subsequently mild astringent sprays failed to give material relief. A solution of sulphate of zinc or of nitrate of silver, of a strength usually non-irritant, caused much discomfort and aggravated the symptoms. A urinary examination showed high acidity, with uric acid and oxalate of lime in excess. He informed me that he was accustomed to take alkalies at intervals, by medical advice. The administration of alkalies and antifermentatives, with regulation of the diet and the inhalation of diluted lime-water, gave prompt relief.

The extreme sensitiveness of the mucous membrane to astringent or stimulant applications here noted is common to these cases, as mentioned by Allen concerning gouty sore throat. I regard it as a point of diagnostic significance, suggesting a careful examination as to the presence of a lithic diathesis.

A similar form of patchy inflammation of the pharynx is seen in some cases, the congestion extending in streaks usually along the posterolateral walls. It is accompanied by an ill-defined sensation of "sore throat," with, perhaps, some laryngeal irritation. A sense of uneasiness, or even positive pain on swallowing, is at times referred to one or other side of the larynx externally—often opposite the superior cornu of the thyroid, as noted by Ingals.[1] This referred sensation occurs more often, in my experience, from inflammation of the pharynx or peritonsillar region than from inflammation of the laryngeal mucous membrane. A case in point is the following:

Mrs. G., aged about thirty-five years, subject to sore throat, referred especially to the sides of the throat, with occasional darting pains into

[1] Loc. cit.

one or other ear. There is some dry and painful cough; no marked pharyngeal secretion. The lateral walls of the pharynx present deep congestion, extending above the free margin of the soft palate and below the plane of the superior margin of the epiglottis. The median posterior wall of the pharynx is but slightly congested. Her attacks are preceded and accompanied by muscular lameness, especially in the muscles of the neck and upper back. Gentle pressure upon the regions of lateral congestion causes them to swell slightly and produces pain darting into the ear and lower pharynx. There is a history of an attack of acute rheumatism in one member of her family. The urine is scanty and high-colored. She is subject to headache, indisposed to exercise, feels often heavy and dull, lives upon rich diet. Stimulating applications cause distress and aggravate the symptoms. She has improved much by regulation of diet, exercise, and the administration of alkalies and antifermentatives. She has frequent relapses, owing to her unwillingness to regulate her habits as directed. These exacerbations are improved by general antilithic medication more than by any local treatment applied.

I have noted a few cases in individuals of lithæmic tendencies, in which their lithic storms were accompanied by marked naso-pharyngeal catarrh, not present in any appreciable degree during the intervals. This symptom is noticed for several days before the digestive and other derangements make themselves manifest. In one case, it is so marked that the appearance of the pharyngeal catarrh is regarded as a signal for appropriate general medication and hygiene, with the effect of checking both the catarrh and the general attack. In these cases the use of the various solutions of iodine is extremely irritant, and all stimulant applications are ill-received.

I have observed a condition of obstinate relaxation of the venous plexus of the turbinated bodies in some individuals coincident with general indisposition of a lithæmic character, and apparently dependent upon it. Caustic applications are badly borne, and fail to accomplish their desired effect on account of too great inflammatory reaction. The use of soothing local applications, and diluents and alkalies internally, with general hygiene, gives improvement in some cases. In others, the time of year marked by damp, cold winds invariably finds them from time to time attacked by symptoms of inflammation and occlusion of the nasal chambers, not necessarily severe, but sufficient to annoy. This resistance to local measures I have been led to attribute, in some cases, to intractable lithæmic tendencies.

In conclusion, I desire to repeat what has been stated above, that the manifestations of lithæmia here described are not regarded as typical; but they have been found associated so often with more or less pronounced lithæmic or allied conditions, and so responsive to therapeusis adapted to this state, that their presence should at least lead to a careful examination of the personal and family history and general condition, to discover what influence lithiasis may have in the case under consideration.

REVIEWS.

A Treatise on Surgery—its Principles and Practice. By T. Holmes, M. A. Cantab., Consulting Surgeon to St. George's Hospital, Membre Associé de la Soc. de Chirurg. de Paris. With four hundred and twenty-eight Illustrations. Fifth edition. Edited by T. Pickering Pick, Senior Surgeon to and Lecturer on Surgery at St. George's Hospital, etc., etc. 8vo., pp. 1008. Philadelphia: Lea Brothers & Co., 1889.

No better proof of the value of Holmes's Surgery as a text-book could be adduced than the fact that it has passed through four editions, and that a fifth is now presented to the medical profession for its favorable consideration. Surgery has made such giant strides in the past fifteen years that it is necessary for an author to be always on the alert, as his book is hardly out of the press before a revision becomes imperative. Our knowledge of to-day may be proven error to-morrow; and what has appeared to be enshrouded in Cimmerian darkness at the present, may be illuminated with the light of discovered truth in the near future. The position, then, of a surgical author or editor must be that of constant literary activity. Surgery is ever progressive and aggressive, and new fields are being daily wrested from the domain of general medicine. Every new edition of a treatise upon surgery must, therefore, cover more ground than its predecessor.

In the fifth edition of this work extensive alterations have become necessary in the chapters on inflammation, wounds, tumors, diseases of the bones and joints, abdominal and cerebral surgery. The present is the epoch of microörganisms, and the *rôle* which they play in surgical affections is freely recognized in this treatise.

We have gone over the present edition somewhat carefully, and have noted casually some of its peculiarities, merits and defects; for instance, the author's classification of wound healing is very simple, but scarcely one to be adopted in this day of antiseptic surgery. His two classes of repair are those which heal with suppuration and those which heal without. The presence or absence of suppuration is too much of an accident to be made the basis of a classification. The older classification is, however, given sufficient notice. Traumatic fever is not considered to be dependent upon the absorption of putrefactive elements, but to the letting loose and subsequent reabsorption of the free fibrin ferment; a view which seems to the reviewer much more tenable than that which makes it a mild form of septicæmia. The wound fevers which come on later are classified as: sapræmia, or septic intoxication, due to the absorption of ptomaines; septicæmia or true septic infection, dependent upon the action of pathogenic germs; and pyæmia, or septic infection with the addition of metastatic abscesses. We are rather surprised that no mention is made of the dependence of suppuration upon the presence of

microörganisms, as the pathologists tell us there can be no pus formations without the entrance of germs. Recent investigations have conclusively proven that tetanus is also a germ disease, but this fact receives no mention by our author. Estlander's operation of resection of the ribs for chronic empyema is mentioned, but without much commendation, which seems to be a little unjust, as numerous cures have been effected by this method, in otherwise incurable cases.

In the treatment of the various intra-abdominal troubles, the author takes a rather conservative position, but laparotomy is recommended without delay in rupture of the bowels and acute intestinal obstruction. The experimental work of Senn, in regard to intestinal obstruction, his intestinal anastomosis, bone-plate suture, rectal insufflation of hydrogen gas for the detection of perforations of the intestines, receives no mention. In fact, this section seems to us to be about two years behind the times.

Kocher's method of reducing dislocations of the shoulder is regarded as the best in use—a view which is quite in accordance with our own. In speaking of the suturing of recent fractures of the patella Mr. Holmes says: "I would not consent to have this operation performed on myself, and I do not, therefore, feel justified in recommending it to my patients."

The complications of gonorrhœa are stated to be rare in females, and no mention is made of gonorrhœal salpingitis, pus tubes, and the like, which occupy such a prominent place in recent gynecological literature. We think it has been pretty conclusively proven that the complications of gonorrhœa are both frequent and very serious in women. Bichloride of mercury injections for the cure of gonorrhœa are not mentioned.

Cerebral surgery is only briefly considered, scarcely as much as the importance of the subject would demand, and the same might be said in regard to the operations upon the stomach. A very timely warning is given against applying too great violence in taxis for the reduction of strangulated hernia. The danger is a real one. Wood's method of radical cure of hernia is quite voluminously described, whilst Macewen's and McBurney's operations have been entirely overlooked.

On the whole the fifth edition of Holmes's Principles and Practice of Surgery is conservative in tone—perhaps a little too much so—and is just a little behind the most advanced surgical thought, but as surgery is progressing so rapidly these little omissions are, perhaps, of not very serious import. The volume can be conscientiously recommended as a capital text-book for students and general practitioners. R. W.

THE MECHANISM OF THE CIRCULATION OF THE BLOOD THROUGH ORGANICALLY DISEASED HEARTS. By HERBERT DAVIES, M.D., F.R.C.P., late Consulting Physician to the London Hospital, and formerly Fellow of Queen's College, Cambridge. Edited by ARTHUR TEMPLER DAVIES, B.A. (Natural Science Honors), M.B. (Cantab.), M.R.C.P., Physician to the Royal Hospital for Diseases of the Chest, etc. Small 8vo., pp. vi., 64. London: H. K. Lewis, 1889.

"ONLY those who were intimately acquainted with my father," says the editor of this valuable little book, "are aware of the infinite care and

trouble he bestowed upon his writings. He never drew any conclusions without most carefully and assiduously verifying the absolute correctness and soundness of his facts." Thus we have before us in clear and convincing statement, an admirable series of studies of conditions not so well understood from the physical or mechanical side as they ought to be; the whole comprised in some three score short pages.

Within recent years, with more extended experience upon the part of a generation trained from the first in physical diagnosis, the gravity of the prognosis in valvular affections of the heart has been greatly modified. We have learned, as Da Costa has recently set forth with so much clearness, to look more to the condition of the heart-muscle, and to the manner in which the balance of the circulation is maintained, than to the particular valve affected or the nature of the lesion. In line with this experience, explaining it, and giving a rational basis for forecast as for treatment, are the studies of Dr. Davies here collected and published in connected form. As set forth in the author's communication to the Royal Society in 1870, by studying the normal circulation we discover that it obeys two fundamental laws: 1. The corresponding chambers of the right and left hearts receive and expel their contents exactly synchronously; ventricle acting in unison with ventricle, and auricle in unison with auricle. 2. Equal volumes of blood pass in equal and the same times through any two corresponding orifices of the heart.

As the two ventricles, acting with unequal forces, send forth equal quantities of blood synchronously, the areas of the pulmonic and aortic orifices must be inversely as the velocity of the currents which traverse them. The two ventricles must likewise receive in the same time equal quantities of blood, and in such a manner that the momentum of pressure of the incoming current is proportional to the inertia of the ventricle which it has to overcome. Thus, the areas of the tricuspid and mitral orifices are also inversely as the velocities of the incoming currents. The force of each ventricle is such as to give its expelled current the proper velocity, to maintain completely the pulmonic and systemic circulations. These objects must be secured within certain limits of deviation, the large veins and right auricle on one side, the pulmonary vessels and left auricle on the other side, being compensatory receptacula. By actual inspection we find in agreement with theoretic requirement, that the ratio of the area of the tricuspid orifice to the area of the mitral orifice, equals 1.3 to 1.4, and that the same ratio holds between the pulmonic and the aortic orifices.

There is also a necessary correlation of respiratory with cardiac activity. If, by reason of unduly prolonged exertion, the heart be stimulated to contract at a speed which the respiratory muscles cannot well maintain, the time allowed for the introduction of air, and also for the chemical change of each charge of blood, being insufficient, a portion of each charge of blood from the right ventricle will remain for a time unaërated, and retained in the pulmonary vessels, and, possibly, in the right ventricle itself. According to the degree of the discrepancy thus caused between the volumes of blood passing through the two sides of the heart respectively, will be the degree of dyspnœa developed. A case of a professional runner is cited, in which this interference with normal mechanism finally led to dilatation and softening of the right heart.

In studying the circulation through hearts in which there is either obstruction or valvular insufficiency at one or more of the orifices, these

three factors are to be considered: synchronous action and equal efflux of blood, upon the part of the corresponding chambers: and sufficiency of aëration. Disturbances may arise from alterations in the proportional areas of similar or of complementary orifices, or merely from diminution of the quantity of blood effectively propelled through a certain orifice. Increased velocity on the one hand, or diminished velocity on the other, may be required to restore the normal harmony; and this again has to be brought about by increase or diminution in the contractile force or capacity of the affected chambers; or of the rate of cardiac contractions.

The author reviews, in detail, the means by which, in the various forms of valvular disease, compensation may be effected through dilatation or hypertrophy, or both, of one or more of the cardiac chambers, with or without alteration of the pulse-rate, so that for a greater or longer period the three necessary factors may be secured. It is impossible within our limits to summarize his conclusions, many of which are not yet parts of our general knowledge. The original papers should be read. S. S. C.

On Cancer of the Uterus; being the Harveian Lectures for 1886. By John Williams, M.D., F.R.C.P., Professor of Midwifery in University College, London, etc. With plates. 8vo., pp. 119. London: H. K. Lewis, 1889.

This is not a treatise, but a series of lectures, as the title indicates, and the character of the author and the work which he has done always entitle him to a respectful consideration. We should expect from him more or less that is original, even on such a subject as cancer, and a decided leaning to the pathological, rather than to the clinical, side of his subject, and in this we are not disappointed. The work is, in short, an analysis of thirty cases representing cancer of the portio vaginalis, the cervix, and the body of the uterus, this being the form of classification which is adopted, and such deductions as would result from such analysis. The cases are beautifully illustrated by eighteen plates, which form as fine a series for the study of cancer as could be desired. Not much is said in regard to etiology, but a great deal concerning pathology. Surgical treatment is advocated, the earlier the better, a positive opinion backed by reasonable statistics being advanced as to the propriety of the supra-vaginal operation for the first two mentioned varieties, and total extirpation per vaginam for cancer of the body.

Considering the insidious manner in which the disease progresses, there is reason for the author's statement that future knowledge concerning it will come largely from pathological rather than clinical investigations. We quite agree with him in regard to the meaningless character of the time-worn terms scirrhous, medullary, and encephaloid, in relation to this disease, and that the only correct classification is the anatomical one, but that for clinical purposes the terms *hard* and *soft* may be used, according as a case presents slow growth and abundance of fibrous tissue, or the reverse. We are quite willing to concede the value of the investigations of Ruge and Veit on this subject, which, however, have not been entirely acquiesced in by the author of this book and others; but if their work marked an epoch in the knowledge of this disease, what can be said of

the precedent work of Billroth, Thiersch, and Waldeyer, especially the latter, who has established the doctrine of the epithelial character of cancer.

Any one who has ever seen much of this disease will appreciate the author's statement that it is difficult to trace its life-history, first, because it is rarely observed early enough to distinguish its first stages; second, because when cases are examined early their true nature is overlooked. There are many reasons why the first stages of cancer should remain obscure. During this stage there are few symptoms of importance, and the average woman does not care to be examined at regular intervals to see whether anything of the kind is developing. The significance of the ordinary erosion of the cervix, as shown by Ruge and Veit, is little appreciated by the majority of gynecologists, and as the clinician, rather than the pathologist, usually sees these cases in their early stage—if they are seen at all—the chances are not very favorable for revolutionary changes at present. Still, the watchman's duty is to sound the alarm, and it has been faithfully sounded in this case, and we heartily wish that every case of eroded or abraded os externum might be subjected to the judgment of the microscope.

Again, there is a class of cases even less suspicious than those in which there is erosion or adenoma, cases which Williams has described as cancer of the cervix—that is, of the glands of the cervical mucous membrane, in which in their early stages there is almost nothing to excite suspicion. The epithelium of the portio vaginalis and of the os is unchanged, and not until considerable headway has been made does the patient become aware that she has a fatal disease. The pathologist is as helpless as the clinician for such cases, and they are not infrequent.

The author entirely rejects the idea that lacerations of the cervix favor the development of cancer; in fact, in cases which he studied, other portions were invaded, and the cicatrix of the cervix was spared, or not involved until late in the disease. We do not feel willing to accept his argument as yet; his cases are too few for the generalizations which he makes, and the bad nutrition of many cases in which the cervix has been lacerated certainly favors the possibility of neoplastic developments. The author's tendency to generalize from insufficient data is seen in some other statements which he has made, and for one who is usually so careful and precise, it would almost seem as if he had departed from his custom in being a little hasty in his conclusions. A. F. C.

Ueber Electrolytische Operationen in den Oberen Luftwegen. Von Dr. R. K. Kafemann.

On Electrolytic Operations in the Upper Air-passages. By Dr. R. Kafemann. Pamphlet 8vo., pp. 16. Wiesbaden, 1889.

This is a lecture delivered before the Verein für Wissenschaftliche Heilkunde of Königsberg, April 15, 1889. It is a practical endorsement of the improved method of practising electrolysis recently introduced by the veteran Voltolini of Breslau, with some modifications of apparatus.

The introduction of electrolysis into therapeutics is credited to Mongiardini and Lando; who preceded Crusell, whose publications in 1841 gave the practical impulse to the method. Kafemann employs a battery of thirty-six Gaiffe zinc-carbon elements excited by a solution of zinc chloride.

With von Bruns, Voltolini, and others, Kafemann rejects the galvanometer on the proper grounds that individual sensitiveness to the current varies so as to render the galvanometer useless as a controlling medium. The electrodes are, like Voltolini's, double electrodes with multiple sharp needle-points. The conducting portions are of German silver; the needles are gold. From large experience in the treatment of follicular pharyngitis, lymphoid hypertrophy at the fornix of the pharynx, hypertrophy of the turbinate bodies, and even the condition best known as ozæna, Kafemann has found this method curative, and curative much more rapidly than any other. He likewise mentions an instance of cure of pachydermia laryngis, and recommends the method in the infiltrations of tuberculosis of the larynx. J. S. C.

THE TREATMENT OF EPILEPSY. By WILLIAM ALEXANDER, M.D., F.R.C.S., Honorary Surgeon, Royal Southern Hospital, Liverpool, etc. 8vo., pp. viii., 220. Edinburgh and London: Young J. Pentland, 1889.

HAVING organized an institution near Liverpool for the care of epileptics the author publishes his views regarding the treatment of this disease. He begins by admitting the failure of a method which he urged some years ago, namely, the ligation of the vertebral arteries. He then proceeds to advance the claims of another operation—the excision of the superior cervical sympathetic ganglia.

Starting with the assertion that "the sympathetic nerves may have something to do with epilepsy, either as a cause or as a means of cure" (page 15), he cites in its support a number of authors whose writings antedate the present epoch of neurological research, and whose conclusions are without pathological basis. He then goes on to state the theoretical considerations which led him to undertake this operation. "Seeing its extensive connection with the cerebral vascular system, may we not hope by interference with this ganglion to alter the nutrition of the brain and gradually render the equilibrium of the nerve cells more stable?" (page 17). The grounds for this hope remain obscure. For all recent physiological investigations upon the sympathetic system, such as those of Francois Franck and Gaskell, and all its pathology, as so carefully worked out by Möbius, appear to have been entirely overlooked by the author or consciously omitted as likely to destroy his hopes. Having once relieved a patient with *tic convulsif* (whose reflex origin is evident from the existence of painful points, pressure on which arrested the spasm), which is wrongly ascribed to a discharging lesion of the cortex (pages 20–22), by excising the ganglion, Dr. Alexander decided to excise others. He describes the operation carefully, and then gives the records of twenty-four cases of epilepsy in which it was done. A careful perusal of these records fails to substantiate the assertion

made in the summary of results that six were cured and ten improved. In two of the twenty-four cases, neither of them pure epilepsy, both being hysterical young women, the fits ceased or diminished about six months after the operation. In none of the others can an approximate cure be claimed, and one is amazed both at the claim and at the lack of scientific accuracy which ascribes an improvement after a lapse of one or two years to an operation whose immediate effects upon the disease are in no way apparent. In the summary it is stated that five cases remained unimproved; but as a fact in fifteen of the cases the attacks appear to have remained about the same in character and in frequency. Under these circumstances one is at a loss to know why any mention of this unfortunate operation should have been made. For the impartial critic cannot but admit that, like the ligation of the vertebrals, it offers no hope at all.

The physiological effects of the operation are very imperfectly studied; the remarkable assertion being made that "where one ganglion only is removed we have contracted pupil and drooping eyelid; when the opposite side is also operated upon the inequalities disappear, and it is impossible to say that the cases have been operated on at all" (page 112). In the photographs which are supposed to support this assertion it may be noticed that an attempt to conceal the evident double ptosis has been made by having the patient look at a point considerably above the horizontal line while the picture was being taken.

In four of the cases post-mortem records are presented, and it is asserted that there is "an increase of vessels in the pia mater" as an effect of the operation (page 117). In two of the four cases the records fail to support this conclusion, while in one of the others the patient died of broncho-pneumonia, and all the organs were congested, the brain included. The statement that in the remaining case a cerebral abscess was found would lead one to some caution in ascribing any dilatation of the vessels or increase in their number to a cause so doubtful, to say nothing of the impossibility of making any such assertion at a post-mortem table as that the vessels of the pia mater are "increased."

The remainder of the book contains a brief discussion of the usual methods of treating epileptics; although it is evident that a lack of care in the selection and management of cases has led the author to condemn too severely the use of bromides, which in spite of his opposition remains the only reliable means at our disposal. He seems to place some reliance upon percussion of the spine!

The chapter upon the care and education of epileptics is admirable and deserves commendation, as it is a subject too often omitted from therapeutical works. The records of thirty-six post-mortem examinations upon epileptics add nothing to our knowledge of the morbid anatomy of the disease. The work is lacking in that critical insight and in that careful study which characterize Gowers's admirable monograph on epilepsy, and in that definiteness of statement which distinguishes Erlenmeyer's work on the therapeutics of the disease. M. A. S.

LEÇONS DE GYNÉCOLOGIE OPERATOIRE. Par VULLIET, Professeur à la Faculté de Médicine de Genève, etc., et LUTEAUD, Professeur libre de Gynécologie l'École pratique, etc. Pp. 448. Paris: J. B. Baillière et Fils.

LESSONS IN OPERATIVE GYNECOLOGY. By VULLIET AND LUTEAUD.

THE world is under no slight obligations to France for its contributions to gynecological literature. The roll of brilliant names glitters with Récamier, Huguier, Aran, Nonat, Bernutz and Goupil, Courty, Péan, and others. Though these men have given lasting memorials of their efforts and have advanced gynecology as a science, none of them, we believe, has published a distinctively surgical work, and it has been the task of the authors to prepare such a work; one which should be for their French *confrères* what Hegar and Kaltenbach's is for Germans, or Hart and Barbour's for Englishmen, or Emmet's for Americans. At least, we presume that such was their intention from their prefatory remarks. But their work cannot properly be compared with either of these, for it is far less comprehensive in its scope, and leaves a gap still unfilled for a complete treatise on operative gynecology. The treatment of disease of the bladder and urethra is not mentioned aside from the chapter on vesico-vaginal fistula, and, what is more incomprehensible, not a word is said concerning diseases of the ovaries and tubes, and their surgical treatment. The subject of electricity, too, which is at present one of the most important in uterine therapeutics, is barely alluded to, and Apostoli and his remarkable work are not even mentioned. Five chapters, more than one-sixth of the book, are devoted to the subject of sterility, the various methods of artificial impregnation, which have usually been barren as to results, being described minutely.

The book is very loosely bound, and many of the plates, so important a feature in a work of this kind, are very indistinct. We regret exceedingly that we cannot speak in more commendable terms, but, in view of the many excellent works on this subject, we cannot help feeling that more was to have been expected from men of such recognized capability as the authors.

A. F. C.

THE CAUSATION OF DISEASE. AN EXPOSITION OF THE ULTIMATE FACTORS WHICH INDUCE IT. By HARRY CAMPBELL, M.D., B.S. (Lond.), Member of the Royal College of Physicians; Assistant Physician and Pathologist to the Northwest London Hospital. 8vo., pp. x., 368. London: H. K. Lewis, 1889.

So few medical works of a purely philosophic nature have been published of late, that the appearance of one upon so abstract a subject as the ultimate causation of disease cannot but attract attention and perhaps excite a feeling akin to admiration for the courage of its author. He has no new facts to present, no new theory to advance. His aim is to educe from the unformulated facts of etiology generalizations which may be suggestive in further investigations.

Cause is defined as "the sum of those material conditions from which a given effect has necessarily followed." Disease is a vital process; it is an "abnormal mode of life." Life may be defined as "a certain inter-

action of cell and cell-environment." The ultimate cause of life is, then, "the material conditions as constituted by the cell plus all those material conditions of the cell-environment which take part in the vital interaction," and we have only to insert the word "abnormal" before "vital" in this definition to obtain our definition of the cause of disease. From this it appears that all disease must depend upon "(1) peculiarity of cell- or tissue-structure; (2) peculiarity of cell-environment; or, finally, (3) peculiarity of both." Structure and environment are, then, the factors which must be discussed.

Structure is found to depend almost entirely upon heredity, and eighty pages are occupied in the discussion of their relations.

Environment is capable of producing structural change as well as affording abnormal surroundings, and has consequently a twofold causative action in disease. In multicellular organisms it must be remembered that "we have to deal, not only with an external-body-environment, in the shape of food, air, and so forth, but with an internal-cell-environment." So intimate is the interdependence of all parts of the body, that it is difficult to conceive disease in one unassociated with derangement of all, due to disturbance of the "internal-cell-environment."

This is the gist of the argument. The book is an extended attempt at its elucidation. Much space is given to the doctrines of evolution as throwing light upon the action of environment. Throughout the book the influence of the writings of Darwin and Spencer is most apparent. At the end a chapter on the etiology of malignant growths is introduced, in which the theory of the dependence of the disease upon the action of microörganisms is advocated.

We cannot but feel that it is questionable whether there is sufficient practical suggestiveness in the author's generalization to warrant the expenditure of the time necessary for the production of so elaborate a work. J. S. E.

STUDIES IN CLINICAL MEDICINE. A RECORD OF SOME OF THE MORE INTERESTING CASES OBSERVED AND OF SOME OF THE REMARKS MADE AT THE AUTHOR'S OUT-PATIENT CLINIC IN THE EDINBURGH ROYAL INFIRMARY. By BYROM BRAMWELL, M.D., F.R.C.P. Ed., F.R.S.E., Assistant Physician to the Edinburgh Royal Infirmary; Lecturer on the Principles and Practice of Medicine in the Extra-academical School of Medicine, Edinburgh. Vol. i., Nos. 1–7. 4to., pp. 135. Edinburgh and London: Young J. Pentland. May 3–July 26, 1889.

THIS publication of Dr. Bramwell's promises to be a very valuable series of papers. It differs from those clinical portions of Dr. Richardson's *Asclepiad*, with which one naturally thinks of comparing it, in being less the deliberate statement of the conclusions reached through a rich experience, than the process of upbuilding experience displayed before the reader. The verisimilitude of the form given to the reports of clinics, in which the questions of the examiner, the answers of the patient, and the teacher's comment are given in detail, substantially in the words and order as spoken, will commend itself to advanced stu-

dents, for whom, we may assume the publication is principally intended. The physician of experience, and, *à fortiori*, the clinical teacher, will find this form less fatiguing than might at first be imagined, for it brings the amusing suggestion of his own somewhat exasperating experiences in endeavoring to extract by cross-examination information stupidly or designedly withheld by patients; or to bring some sort of order out of the confused tale of symptoms and medication hurled at him by the chronic dispensary-rounder.

Whether we are to judge from the author's introductory that his methods of examination and illustration are not commonly employed in the Scotch or British schools, we cannot be sure. If we might venture a suggestion to so competent a teacher as Bramwell, we would say that the occasional introduction of a method, constantly used by Da Costa with great success at the Jefferson Medical College, might still further increase the practical value of these admirable clinics and reports. This is, the withholding of extended diagnostic comment until the examination of the patient is completed; then, the main points being succinctly recapitulated, if necessary, by the teacher, the class is called upon for diagnosis. Three or four opinions, which are necessarily representative of those which are most likely to be held in practice, and between which discrimination is needed, are usually ventured; and form the basis of valuable remarks upon the differential diagnosis of the affections in question, and the application of the principles laid down, to the case under consideration.

We have thus far said nothing of the value of Dr. Bramwell's comments upon his cases to students who have long since ceased regular attendance upon lectures, except perhaps in the character of lecturer. This is, in most of the cases, very great. The spontaneous and somewhat colloquial expression, and the exigencies of the occasion, in this manner of teaching, are bound to bring forth the little points of personal observation or preceptorial inheritance, which are either not committed to the serious writing of text-books, or withheld for the further opportunities of study and comparison, which, perhaps, never come. For the same reason that the notes of the lectures of a valued teacher are so much richer in practical instruction, so much more individual and characteristic, than the books of even the same author, these flying comments of Bramwell are likely to become valuable sources of reference; and the author should be encouraged in their publication, which is bi-weekly during the months from October to July inclusive, and the price of the separate numbers is but 6*d.* each. Illustrations, including colored plates, are freely introduced, and the type is clear and readable.

In the numbers before us, among subjects discussed with fulness and authority are "Herpes Zoster," "Exaggerated Epigastric Reflex in Ulcer of the Stomach," "Aneurism of Thoracic Aorta," "Aneurism of Right Common Carotid," "The Histological Changes in Paralyzed Muscles and Nerves," "Phthisis treated by Intra-laryngeal Injections of Menthol and Olive Oil," "Intra-cranial Syphilis," "Mitral Stenosis," "Chlorosis," "Pernicious Anæmia," "Bright's Disease." These titles, selected at random, indicate a wide range of discussion; which is particularly valuable in enforcing the lesson, now so much needed, of the pre-eminent value of catholic reading and experience. The best specialist, except where operative skill or recondite technical knowledge is required, is the accomplished general consultant. S. S. C.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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ASSISTANT PROFESSOR OF THERAPEUTICS IN HARVARD UNIVERSITY.

Comparative Value of Antipyrin, Antifebrin, and Phenacetin as Antipyretics.

Since the introduction of phenacetin into India, Surgeon-Major A. Crombie set himself the task of noting its effects and of comparing them with those of other antipyretics of already established reputation.

The patients were given an antipyretic when the temperature reached 102°. In each instance the following points were noted: The hour at which the drug was given, the axillary temperature at that time, the number of hours that elapsed before the subsequent lowest temperature was reached, the lowest temperature noted after the administration of the drug, the number of hours which elapsed between the time it was given and the time when the temperature was again high, and the number of degrees which the temperature fell.

The antipyretics were used in various diseases accompanied by fever. The first case was one of intermittent fever, where the temperature was reduced by five-grain doses of antifebrin; later in the disease twenty-grain doses of antipyrin were administered, and, later still, four-grain doses of phenacetin. The amount of reduction in degrees and the duration of the reduced temperature were both in favor of phenacetin, but it was given later in the disease than the others.

In another case, one of enteric fever, in a girl, fourteen years old, antifebrin was used in the latter part of the illness. Here there was little to choose between the two drugs, but neither of them compared with plain cold sponging in this case, so far as the permanence of the effect went.

Similar experiments were made with a few other cases, and, although the total number of cases is small, the outcome of the observations will be briefly noted.

As regards efficacy, antipyrin comes first, and there is little to choose between antifebrin and phenacetin, in the doses in which they were given.

So far as safety is concerned, the advantage lies with phenacetin. A subnormal temperature from phenacetin was not observed; it was, however, seen to follow the use of antifebrin, but there never was collapse, which occurred once after antipyrin. In rapidity of action antipyrin, probably on account of its solubility, comes first, antifebrin second, phenacetin third. The fall after the use of phenacetin is more gradual, and the minimum is not reached for three, four, or five hours after the administration of the drug; the duration of this effect is longest with phenacetin.

As regards certainty of action, they stand in the same order as that of their rapidity—antipyrin, antifebrin, phenacetin. The tabloids of phenacetin were so hard as to be practically insoluble in the stomach, or they dissolved so slowly that a very small quantity of the drug entered and circulated with the blood at one time—not sufficient to affect the temperature. It should be prescribed either in powder or in lozenges which are soft and friable.

In India, phenacetin is followed by just as profuse sweating as either antifebrin or antipyrin. This is a great drawback in the use of antipyretics, patients are obliged to change their clothing once or twice in a night after the use of any of these drugs.

These drugs obviously do not shorten an attack of fever; they have no abortive effect. There are probably a certain number of cases of fever which have been brought to a sudden termination by their use, cases in which there is a sudden attack of high fever after a chill or exposure to the sun, in which a dose of antifebrin or phenacetin is followed by profuse sweating and a cessation of all further febrile symptoms.

In cases of fever where the temperature is very high, Major Crombie believes that it should be reduced at all costs—by the use of cold, if the circumstances of the patient and the prejudices of friends will permit. When we have no choice but to use drugs, antipyrin is the most rapid and certain.

If there is no urgency, the choice would be between antifebrin and phenacetin, sometimes one and sometimes the other will be preferred. If the avoidance of any chance of collapse is desired, phenacetin will probably be the best antipyretic. If, on the other hand, the case requires more prompt interference, antifebrin will be chosen.

Appreciable ill results were not observed; the sweating is certainly unpleasant, but is compensated by the feeling of relief which the fall of temperature brings with it; the patients prefer the drug and the sweating. Phenacetin undoubtedly possesses a soothing and soporific effect, so much so that in cases of slight feverishness, accompanied by insomnia and great restlessness, small doses of three or four grains of phenacetin, not sufficient to produce perceptible diaphoresis, insure a quiet, peaceful, and sleepful night with no headache in the morning.

In heat apoplexy, sunstroke, and hyperpyrexia generally, antipyrin is indicated; in temperatures of 103° to 105°, antipyrin or phenacetin; in temperatures below 103°, the preference should be given to phenacetin.—*Indian Medical Gazette*, July, 1889.

Dangers of Antithermic and Analgesic Anilides.

Among the crowd of modern drugs it is difficult to have a clear conception of their individual action and uses; when it is possible to class them according

to their chemical or other relationships, the group characteristics may be more readily kept in mind as a useful guide to their administration. A group of antipyretics, having aniline as a chemical basis, may be profitably considered from this standpoint. In aniline one may replace an equivalent of hydrogen by formyl or by acetyl, and obtain formanilide or acetanilide; these are the simple anilides. There is further a second equivalent of hydrogen which may be replaced by an alcohol radical, methyl. In this way other compounds, methylformanilide and methylacetanilide, are obtained. It is probable that these substances partake, to some extent, of the poisonous qualities of aniline; and arranged according to their poisonous doses for animals, the methylacetanilide is the most poisonous, then acetanilide and methylformanilide, and, last, formanilide. Their toxic properties increase in proportion to their molecular weights.

By comparing the action of these substances upon animals we may, perhaps, have some hint of the secret of their medicinal virtues and the dangers of their use in practice. They are found to modify the chief systems of the economy, the nervous, the muscular, and the circulatory.

Experiments show that the blood is profoundly altered, arterial blood becomes darker, and, as shown by Henocque, by means of the spectroscope, there is a gradual reduction of the oxyhæmoglobin, and methæmoglobin appears. Analysis of the gases in the blood shows that the oxygen is diminished, and the analyses of Aubert indicate that the amount of fibrin is diminished. Although the number of blood corpuscles is not lessened, there seems to be produced by the members of this group what may be called an asphyxia of the blood corpuscles.

The temperature may be lowered one or two degrees by small doses, four or five degrees by moderate doses in three-quarters of an hour, fatal doses reduce the temperature twelve or fifteen degrees in two or three hours.

Upon the muscular and nervous systems their action is profound; after moderate doses of formanilide there is slowness of movement, a torpid state, and more or less loss of reflex power; after such a dose the power of movement is gradually regained, but a slight ataxia usually remains for some time. Large doses produce complete loss of muscular and nervous power; an animal to which such a dose has been given lies helpless, but still sensible to pain. After still larger doses there occur convulsions, dyspnœa, coma, and death.

The lungs and other organs of an animal dying in this way present the changes typical of asphyxia.

Inhalations of ether stop the convulsions; section of the spinal cord limits the movements to muscles above the point of section.

The action of the other anilides is much the same as that of formanilide. They produce peripheral paralysis and affect the cerebro-spinal centres. The hope that methylformanilide and ethylacetanilide would show less toxic power than the simple anilide is overthrown. Methylacetanilide, under the name of exalgine, calls for as much care in its administration as the other anilides.

It is obvious that extreme prudence should be exercised in the employment of the members of this group.—*Gazette Hebdomadaire*, September 13, 1889.

Intra-venous Injections of Salt Solution.

The indications for increasing the volume of the blood, when it has been suddenly diminished, may be met at any time by every practitioner. It is, therefore, desirable that physicians should be familiar with some of the principles involved in the use of this means of reviving a patient, especially as the operation is a simple one.

Dr. William Hunter has drawn attention to this subject, in a recent number of an English journal, which contains a summary of the lectures given by him on transfusion.

It should be borne in mind that transfused blood possesses no nutritive value. Transfusion is, therefore, useless in all forms of "atrophic" anæmia, where the changes in the blood supply simply correspond in degree to the wasting changes occurring in other tissues. The examination of the blood alone enables us to determine whether the anæmia is "atrophic" in its nature or not.

Blood, rather than salt solution, may be needed where the red corpuscles are incapacitated, as in carbonic oxide poisoning, where venesection should always precede the transfusion. Even then the procedure is of doubtful value. There is scarcely a single condition of the blood in which the want of red blood-corpuscles is a source of urgent danger.

After the greatest losses of blood in animals a sufficient number of red corpuscles always remain in the circulation to carry on respiration, provided the circulation is maintained. In man, the loss of blood can never be so great as in animals, as syncope occurs earlier.

Blood is, therefore, not required to carry on respiration after sudden loss of blood in a patient previously healthy. Nor does transfusion of blood, rather than saline solution, seem to be indicated on account of its respiratory value in anæmia.

The immediate source of danger from sudden loss of blood is the fall in the blood-pressure to a point where the circulation cannot be maintained; the indication is, therefore, to raise the pressure within the vessels, for death will ensue unless means be taken to meet the threatened failure of the circulation.

While defibrinated blood may have certain advantages over saline solutions, in restoring the tone of the vasomotor centres, these advantages are more than neutralized by other and still greater disadvantages. For example, it is difficult to obtain blood in sufficient quantity or with sufficient rapidity, as compared with the ease with which a simple saline solution can be prepared. There are dangers attending the tranfusion of blood not encountered when saline solutions are used.

For practical purposes all the advantages to be gained by transfusion may be equally well and more readily obtained by injecting a neutral saline, such as a three-quarters per cent. solution of common salt (about one drachm to the pint).

The only pressing indication for transfusion is collapse from sudden and severe loss of blood. With regard to its performance, two points may be noted: to use simple instruments, a glass canula with a piece of India-rubber attached, and a clean syringe, and never allow the temperature of the solution to rise above that of the body.

Milk, or other mixtures possessing what are supposed to be nutritive properties, are never indicated. They have no value, not possessed by an equal bulk of saline solution.

[It is simpler to let the solution flow in from a glass funnel rather than use a syringe; a glass canula, three feet of small, clean tubing, and a funnel, are all the special apparatus required.—ED.]—*British Medical Journal*, August 10, 1889.

HYDROXYLAMINE.

In 1865 the chemist LOSSEN discovered a substance capable of forming salts, and having the formula $2H_2O + NH_2OH$, to which he gave the name of hydroxylamine. The toxicological property of it and its salts was studied, in 1888, by Professor Binz, who found that it produces in the lower animals stupor, convulsions, hæmaturia, and discoloration of the blood; the latter change being due to the formation, not only of methæmoglobin, but also to the reduction of this substance in part to hæmatin. In his experiments the physiological action of the hydroxylamine so closely resembled that of pyrogallic acid, chrysarobin, anarobin, and allied substances, which have been found serviceable in the treatment of psoriasis, that he suggested its use in skin affections.

The physiological action of hydroxylamine has, during the present year, been further studied by Professor L. Lewin, of Berlin, who has not added very much positive information to the results previously obtained, but has determined that it affects dead and living blood similarly, and that its action upon the corpuscle is probably due to its decomposition, and the liberation of nitric or nitrous acid.

The practical suggestion of Professor Binz has led to trials of the drug by the German dermatologists, and especially to a careful study of it by John Fabry (*Archiv Dermat. et Syph.*, vol. ii., 1889). This clinician found that a ten per cent. solution is excessively irritating to almost all skins, causing intense redness, violent burning, sweating, and not rarely blistering the part. Some skins will not bear a one per cent. solution, so that it is not safe in a new case to begin with a stronger application. The solution should be gradually increased, and be applied at intervals of one, two, or three days, according to its effects. In the cases studied by Fabry, the results were most favorable. One very severe example of chronic psoriasis, which had resisted other treatment, had the ordinary solution of pyrogallic acid applied to one arm, to the other the solution of hydroxylamine. At first the arm treated with the acid appeared to improve most rapidly, but in a few days the other arm overtook and passed it on the road to recovery, and was well some time before the other.

Two formulæ have been used by Fabry, the one spirituous, the other aqueous:

Hydroxylamine muriate	2 to 5 parts.
Alcohol	100 "
Chalk	sufficient to neutralize.

Mix and filter.

Hydroxylamine muriate	1 part.
Water	1000 parts.
Chalk	a sufficient quantity to neutralize.

Mix and filter.

The great advantage which hydroxylamine has over pyrogallic acid, anarobin, chrysarobin, and other previously used substances is, that while the latter always deeply stain the skin, it is entirely free from color and from dyeing properties.—*Therapeutic Gazette*, September, 1889.

Chloramide.

Certain of the properties of this new hypnotic should not be overlooked. It is slowly decomposed by carbonates and bicarbonates, and quickly by caustic alkalies; by weak acid solutions it is not easily decomposed. From this it follows that it is best given in slightly acid solutions rather than in alkaline ones. According to von Mering, the dose is 45 grains. After six healthy students had taken doses of from 15 to 60 grains each, they all slept two hours longer than usual, and only two observed any after-effects, and they complained simply of a slight headache.

Drs. Hagemann and Strauss gave the drug to fifteen patients suffering chiefly from nervous and cardiac diseases, phthisis and anæmia.

No changes were observed in the constituents or the quantity of the urine. The results obtained varied considerably; sometimes a good result follows the use of 15 grains, while in other cases larger doses were useless. In a few cases it did not always succeed, even in large doses, although the insomnia was unaccompanied by pain. In two cases a smaller amount gave sleep and relieved unmistakable pain

Von Mering reports it as an unsuitable substance to employ to relieve pain. It is not without unpleasant accompaniments; this is illustrated by one case where the patient complained of dizziness during the whole of the following day, though in this patient head symptoms were caused by sulphonal to even a more marked degree.

Other observers have arrived at much the same result; at present it may be regarded as an uncertain hypnotic, ineffective when there is pain and liable to be followed by undesirable symptoms.—*Berliner klinische Wochenschrift*, No. 33, 1889.

In another number of the same journal Dr. Alt, of Halle, after a considerable experience with this new hypnotic, gives it his endorsement. He believes that it is a desirable addition to our resources, especially in the treatment of simple insomnia. It exerts no harmful effects either upon the circulation, respiration, or digestion, and is followed by only slight unpleasant accompaniments.

For insomnia doses of from 30 to 45 grains were administered, which were followed by sleep in from one-half to three-quarters of an hour in most of the cases.—*Ibid.*, September 9, 1889.

Sugar as a Diuretic.

In the last month's report there appeared an account of the use of sugar of milk as a diuretic, especially in cardiac disease.

According to PROF. DUJARDIN-BEAUMETZ, grape-sugar may be employed for the same purpose.—*Berliner klinische Wochenschrift*, No. 33, 1889.

ERGOT IN CHILDBED.

DR. PINZONI, of Bologna, has made some interesting clinical experiments in order to determine, with something like precision, the value of ergot in childbed. He administered ergot systematically to ninety-one lying-in patients, generally in the form of thirty grains of the powder daily. Seventy-nine similar cases were treated without ergot. After comparing the series, he came to the following conclusions: Ergot has little or no influence on the temperature, at the most a slight rise is occasionally observed. It hastens the pulse a little, yet has no marked influence on the physiological slackening of the pulse observed during the first days after delivery. The physiological increase in the secretion of urine during the first days is favored by ergot. The involution of the uterus, according to Dr. Pinzoni's researches, is either totally uninfluenced by ergot, or slightly retarded. The escape of the lochia remains normal when that drug is given; but clots, as universal experience has proved, are more readily expelled. The lochia seldom remains fetid when the ergot is taken. Ergot delays the after-pains in primiparæ, and lessens them when they have already commenced. The secretion of milk is retarded and lessened by ergot, and sometimes completely suppressed. Ergot seems, in the opinion of Dr. Pinzoni, to be a prophylactic against puerperal fever, an indirect antiseptic agent. When infection has already taken place, ergot appears, on the other hand, to hasten the entrance of the virus into the circulation. Dr. Pinzoni's researches appeared in the *Bolletino delle Scienze med. Bologna*, series vi., vol. xx.—*British Medical Journal*, Aug. 10, 1889.

FOR MIGRAINE.

The following powder is recommended by DR. HAMMERSCHLAG:

℞.—Caffeinæ citratis . . . . . grs. xv.
Phenacetini . . . . . grs. xxx.
Sacch. alb. . . . . grs. xv.
Divid. in part aeq. No. x, ad caps. amyl.
Sig.—One capsule every two or three hours.

FOR TOOTHACHE.

The following liquid may be used to moisten a piece of cotton to be inserted into the cavity of a painful tooth to give relief:

℞.—Extr. opii, Bals. Peruv. } . . . . . āā grs. viij.
Masticis . . . . . grs. xv.
Chloroform . . . . . ℥ijss.
—*Therapeutische Monatshefte*, August, 1889.

MEDICINE.

UNDER THE CHARGE OF

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ASSISTED BY

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WALTER MENDELSON, M.D.,
OF NEW YORK.

SOME REMARKS ON TYPHOID FEVER; WITH AN ANALYSIS OF 129 CASES.

F. C. SHATTUCK (*Boston Medical and Surgical Journal*, cxxi. 221, 1889) analyzes the results of his experience with typhoid fever in the Massachusetts General Hospital during the last three years. He excludes all abortive or otherwise doubtful cases, but includes those patients who entered the hospital in a desperate condition and died within a few days. In this connection he remarks on the occurrence of abortive typhoid fever, questioning how anyone of experience can doubt its existence, and quoting from the literature of the subject to show that typhoid fever can certainly be present even without the slightest elevation of temperature. Of the 129 cases, 11 died, a mortality of 8.8 per cent. In none of these was unusually or continuously high temperature a feature. A table is given showing the state of the bowels, the occurrence of epistaxis, and the existence of splenic enlargement. This table shows that in 51 per cent. there was no diarrhœa, and in 36 per cent. the bowels moved only after enemata. In only 25 per cent. was looseness of the bowels really a prominent feature, a smaller percentage than the text-books would usually indicate. Epistaxis was present in 38 per cent. The author is inclined to consider splenic enlargement less common than usually supposed. He gives a table of the frequency and character of the complications and sequelæ, and calls attention to the fact that there was no instance of perforation among his cases.

In discussing relapse, the author follows the English writers in defining it as a renewal of the typhoid process, irrespective of the time of its onset; as opposed to the Germans, who claim that to constitute a relapse there must have been an interval of apyrexia of varying length. 21 (16.28 per cent.) of his cases suffered relapse, but as one of them relapsed twice, there are 22 secondary attacks for study. In 11 of these the relapse was intercurrent, *i. e.*, occurred before complete defervescence, before the first normal evening temperature; and in 11 others it was consecutive, *i. e.*, developing after defervescence. This fact proves, he thinks, that we are powerless to prevent a relapse, and that errors in diet have nothing to do with it. In the great majority of his cases the second attack started without any change in the liquid diet. Various causes may occasion a return or an exacerbation of the fever, but to produce a relapse there must be a re-infection or auto-infection.

In the 11 intercurrent cases the relapse took place in from the third to the fifth week. In the 11 consecutive cases it appeared after an interval of from one to nine days. 21 of the cases recovered, the average duration of the second attack having been nineteen days, but with an individual range of from eleven to twenty-nine days. The author has excluded from this list those which might be classified as instances of abprted relapse, on account of the difficulty in distinguishing between such very short attacks and some obscure complication. His experience does not bear out the German view that intercurrent attacks are more dangerous than consecutive ones.

In 18 of his 22 cases the fever reached its height on the fourth to the sixth day, and more often on the fifth than on any other day. The sudden fall of the temperature on the eighth to the ninth day, mentioned by Irvine as characteristic of relapse in typhoid fever, the author has not been able to corroborate throughout. In only 6 of his cases did this drop occur on either of these days. In some it was noticed on the sixth, in more on the tenth or the eleventh, and in others the fever terminated by an uninterrupted but gradual lysis.

The treatment was essentially expectant. In 29 per cent. no drug of any kind nor any alcoholic stimulant was given at any time. Digitalis and cocaine were the cardiac stimulants employed when such medicines were indicated. The author was especially pleased with the apparently prompt and marked action of the latter in some cases. Calomel and naphthalin were administered in a few cases to see whether intestinal antisepsis could be procured, but the results were not encouraging. The author used the internal antipyretics a good deal in 1886, but very little in the two succeeding years, and only then when the fever itself appeared to interfere with the comfort of the patient. The knowledge which we now possess renders it probable that it is not the high temperature which is the great cause of death in typhoid fever, but the influence on the nervous system of the alkaloidal poisons produced in the living body. The author quotes the experience of several observers in support of this statement. He is being gradually forced to the conclusion that the method of Brand for the treatment of typhoid fever is the best, and that we must come to it in this country. The statistics which Brand gives, and which Shattuck quotes, show how very much less the mortality is in patients treated by this method.

Naphthalin and Typhoid Fever.

E. Sehrwald (*Berl. klin. Wochenschr.*, 1889, xxvi. No. 22, 492), after a series of bacteriological experiments on the action of naphthalin on the typhoid bacilli occurring in typhoid stools, comes to the following conclusions:

1. Naphthalin in substance, acting at the ordinary temperature of a room on the microörganisms of putrefaction, of feces, and of typhoid fever, hinders their development somewhat, though only slightly.

2. Enlargement of the surface of the naphthalin powder increases correspondingly its disinfecting power. Persistent shaking of the fluid containing naphthalin acts in the same way.

3. On increasing the temperature to that of the human body the action of the naphthalin on all the varieties of bacteria mentioned is decidedly greater;

and it therefore becomes probable that it is in the form of a gas that naphthalin acts injuriously and destructively on the microbes.

4. Naphthalin, as a gaseous disinfectant, must act more energetically on the aërobic varieties in fluids than on the anaërobic forms. So, also, it will affect more completely those which grow on a solid culture medium than those living in a fluid.

5. The conditions for the action of naphthalin are much more favorable in the intestine than in the reagent glass; since not only does the body-heat produce a powerful volatilization of the substance, but through the peristalsis the intestinal contents are constantly kept in motion and new portions of the fluid brought into contact with the naphthalin gas.

6. Naphthalin added to feces outside of the body diminishes the number of microbes contained in them about one-half. When given internally it reduces the number to about one-third to one-fourth of the original. The quantity then increases, however, to nearly the initial amount, owing to the great increase of microbes which are more resistant to the action of the drug.

7. The bacteria of the typhoid stool are acted on very powerfully by naphthalin, and reduced nearly ten times. Also on those still remaining after the administration of calomel naphthalin acts very injuriously.

8. Since typhoid fever is to be regarded as a mixed infection, naphthalin, on account of its action on microbes, should be given from the beginning of the affection. And since its gas, at the temperature of the body, acts with especial power in hindering the growth of the typhoid bacilli, the therapeutic employment of the drug is still further justified in this disease.

9. Since calomel has a disinfectant action on a portion of the fecal bacteria in typhoid fever, but spares other forms which are more subject to the action of naphthalin, the earliest possible combined administration of the two drugs must seem to be the most rational procedure.

10. The naphthalin introduced into the intestine is absorbed in part, and undergoes a change in the body and is excreted in the urine. The decomposition-products from the naphthalin, which are found in the blood and urine, have no restraining power on the growth of the typhoid bacilli.

The author believes that the results of his experiments fully justify us in continuing the administration of naphthalin in typhoid fever, with the hope that we may exert a favorable action on the disease.

Equino-telluric Origin of Tetanus.

Verneuil (*Prog. Méd.*, April, 1889; *Manchester Med. Chronicle*, June, 1889) terminated the reading of a memoir on this subject at the Académie de Médecine with the following conclusions: 1. Tetanus is transmissible not only between animals of the same species, or of different species, but also from man to man, from animal to man, and reciprocally. 2. Contagion between a tetanic horse and man may be direct or indirect, mediate or intermediate. 3. The intermediary agents are all those objects which, whatever may be their nature, come into contact with a tetanic horse and receive undestroyed the virulent element; multiplicity of contacts and objects increases, therefore, the circle of infection. 4. Living beings can serve as organs of transmission without their being themselves affected; but they are then under the

menace of tetanus by traumatic auto-inoculation, this being effected as soon as a point of entry is open to the virus. 5. A wounded man can contract tetanus from the greater part of the objects with which his wounds come in contact, but the cases and experimental researches show that the most dangerous is the horse and all articles connected with it, and cultivated earth and some of its products. 6. The earth only possesses a tetanic virulence after contamination with a tetanic horse. 7. Statistics show that the greatest liability attaches to those who are in habitual contact with horses. The topographical distribution of human tetanus is parallel to the equine variety. In our climate the latter, like glanders, is the more frequent. The prophylaxis of human tetanus is, therefore, in the hands of the veterinary surgeon.

Antifebrin in Epilepsy.

Th. Diller (*Therapeutic Gazette*, June, 1889) reports in detail the results of his employment of antifebrin in nine cases of epilepsy. The drug was administered in doses of four grains three times a day; though in two cases the amount was doubled.

He sums up his experience in the following conclusions:

1. That in all the cases in which the drug was given continuously there was noted a reduction in the number of the fits, ranging from about 25 to 75 per cent. as compared with other months during which patients were on bromide and tonic treatment.

2. The remedy was in all cases well borne, producing no apparent mental or physical depression. This is in marked contrast with the depressant effects noted after a course of bromide treatment.

3. No eruption of the skin was produced.

4. In any case where a great number of fits are occurring, and in which it is desirable to control them as soon as possible, the bromides would be of far more value than antifebrin.

A Case of Tumor of the Cauda Equina, illustrating Certain Points in Spinal Localization.

Thorburn (*Manchester Medical Chronicle*, June, 1889, 177) reports the following interesting case of tumor of the cauda equina: The patient, a man of thirty-one years of age, had no history of syphilis or alcoholism. Six years previously he had commenced to suffer pain in the lower part of the back, extending thence down the back part of the lower limbs to the heels. Coincidently with this he experienced difficulty in micturition at times, and obstinate constipation. This condition lasted until eight months before he came under observation, and may be called the first stage of the disease. The pain in the back of the legs was now gradually replaced by numbness, and pain developed in the front of the thighs, from the hips to the knees. At the same time the patient noticed feebleness in the lower limbs, especially on the right side. After this there came loss of the power of coitus, though with occasional erections and nocturnal emissions. This condition of affairs, which lasted until three months before entering into the hospital, the author calls the second stage of the disease.

For the last three months the pain, numbness, and muscular weakness had

grown worse, and he had ceased to have erections. This was the third stage of the affection.

On admission to the hospital, the lower limbs were wasted; there was no paralysis, though all the muscles were weak, and the toes showed a tendency to drop in walking. Muscle sense and the electrical reactions were normal; the bowels obstinately constipated, and the urine absolutely retained. The sensory affections were most interesting. The lower lumbar vertebræ in the middle line were painful on pressure and on movement. There was pain over the front of the thighs, but no exaggeration of sensibility to pain on touch. There was nowhere absolute anæsthesia, but great blunting of sensation in the penis, scrotum (except at the upper part), perineum, gluteal region, and antero-posterior aspects of the upper parts of the thighs. This blunting extended down the centre of the back of the thighs, over the calves (except on the inner side), and to the soles of the feet, where it was again more developed, but spared the inner aspect of the foot, great toe, and half the next toe. Less marked loss of sensation affected the front of the knees, the outer side of the legs, and the outer side of the dorsum of the foot. The sensory deficiency was more marked in the leg and foot of the right side than of the left. Some sensation was retained in the urethra.

The plantar and gluteal reflexes were lost on both sides; the cremasteric reflexes were retained, and the abdominal exaggeration; there was no ankle clonus; knee-jerk was absent on the right side; and, though present on admission, soon disappeared on the left side.

The author thinks there is no doubt that the patient was suffering from pressure on the cauda equina. The progress of events was too slow for us to suppose that a disease of the lumbar cord existed. The duration of the case and the course of the symptoms pointed toward tumor rather than meningitis. The history of the patient contra-indicated tubercle, and the growth was, therefore, probably a connective-tissue tumor.

In pressure lesions of the cauda equina the lower roots almost invariably suffer most. Consequently, there was first in this case paralysis of the fourth sacral root, which supplies the bladder and rectum, together with irritation, causing pain in the sensory branches of the first three sacral roots. In the second stage, coming on eight months after admission, the third sacral root was also paralyzed, with resulting loss of power of coitus; and at the same time anæsthesia developed in the previously painful areas; while the irritation spread to the third and fourth lumbar roots.

In the third stage, coming five months later, pressure on the second sacral root produced paralysis of the *nervi erigentes*. Anæsthesia was now well marked in the cutaneous distribution of all the sacral roots, and was less obvious in that of the fifth lumbar; pain being confined to the distribution of the third (? and fourth) lumbar roots.

Motor weakness affected most of these roots, but was well marked in the second sacral (supplying the extensors of the toes, etc.), and was still greater in the third and fourth sacral. The first two lumbar roots escaped entirely.

The tumor must have been situated below the upper border of the second lumbar vertebra, because the spinal cord terminates here, and it is clear the cord was not involved. As the third lumbar roots were certainly affected,

the growth must have been situated between the upper border of the second and the lower border of the third lumbar vertebræ.

Origin of the Vesicular Respiratory Murmur.

Dehio (*Deutsche med. Wochenschr.*, No. 29, 595, 1889) claims that several clinical facts oppose the explanation given by Boas and Penzoldt of the origin of the vesicular respiratory murmur, according to which it is to be considered as a bronchial respiration, a stenosis-sound, produced in the larynx and modified by passing through the pulmonary parenchyma containing air. Among these facts is the diminution of the vesicular murmur in cases of laryngeal stenosis, though there is a very loud sound of stenosis produced in the larynx. The diminution of the murmur in dry pleurisy, owing to the limitation of motion of the affected side as a result of pain, and the harsh puerile breathing of children, though without any increase of bronchial breathing over the larynx and trachea, are both opposed to the theory of Penzoldt. If heavy weights are laid on one side of the thorax of a man in a reclining position, until the respiratory movements are nearly or entirely prevented, the vesicular murmur is made decidedly weaker than on the other side, which could hardly be the case were this simply a transmitted sound. Dehio holds that vesicular respiration is not a sound transmitted from the larynx, but is produced within the lungs, and he believes that the following experiment demonstrates this: A lung, dried by injections of glycerine and consequently elastic, is distended by air blown from bellows through the bronchus; but at the same time a loose plug of cotton placed in the bronchus does away with any bronchial murmur which might otherwise arise. The ear placed over the lung will now hear no bronchial murmur, but a loud and unmistakable vesicular murmur. We must, therefore, return to the former view, that the vesicular sound is produced within the lung.

Regarding the question as to how this is brought about, there are two possibilities: 1. That the sound is due to vibrations of the air passing through the lungs, these vibrations being seated in the finest bronchioles or in the alveoli; since were they produced in the large bronchi, a bronchial murmur would be the result. 2. The view of Gerhardt, that the vesicular sound is the result of the tension on the pulmonary parenchyma, especially of the alveolar septa, occurring at each inspiration. Dehio believes the following experiment proves that Gerhardt's explanation is not correct, and that the theory of the vibrations of the current of air is the one to be adopted. The glycerine-dried lung is moderately distended, the cotton placed in the bronchus, as before, and for the same purpose, and the bronchus then closed entirely air-tight. If now gentle compression be made on any part of the lung and then the pressure be relaxed, a distinct vesicular murmur can be heard on auscultation. This must be due to the motion of the air from one part of the parenchyma to another under the influence of the pressure, and the return of the same to the compressed alveoli after the pressure is removed. With the moderate distention of the lung, there can be no possibility of tension on the parenchyma such as Gerhardt claims. Since we know, now, that sonorous vibrations of air in the bronchial tubes can only be produced where there is a sudden alteration of calibre, the sound must be developed at the point at

which the finest bronchi normally undergo a sudden narrowing—*i. e.*, at their last bifurcation, and at the point of entrance of the bronchi into the infundibula. The combination of these numerous stenosis-murmurs is the origin of that acoustic phenomenon which we designate the vesicular respiratory murmur. In the living person, however, there is a combination of this with the bronchial sound transmitted from the trachea and bronchi, and altered by passing through lung tissue. The vesicular murmur heard on the living chest is, therefore, somewhat modified, and is not always so distinct as that heard over the prepared lung.

Two Cases of Aneurism of the Arch of the Aorta Perforating into the Superior Vena Cava.

W. T. Gairdner (*Lancet*, 1889, i. 1233) reports a case of this rare affection. The patient, aged forty-four years, exhibited very marked cyanosis with general anasarcous swelling of the upper part of the body, extending secondarily down the back as far as the sacrum, but not at any time affecting the lower extremities. He was under observation in the Glasgow Western Infirmary for a week before death took place. The patient had for some years experienced a slight degree of pulsation in the neighborhood of the right sterno-clavicular articulation, which did not, however, give him any concern. A week before he came to the hospital he had a sensation as if "something had given way" to the left of the cardiac apex. This was accompanied by faintness, but not by pain. Swelling of the face and right arm followed. There was some dilatation of the superficial veins all over the front, especially on the lower sternal region. The veins of the hands were also distended, more markedly on the left side. A loud double murmur, having the distribution of that of double aortic disease, could be heard all over the front of the chest. The pulse at the right wrist was stronger than at the left, and exhibited here the usual characters of the pulse of unfilled arteries. The pupils were equal. There was some displacement of the præcordial dulness downward and to the left, and another area of dulness beneath the manubrium extending both to the right and left. In spite of the cyanosis there was but little cough or dyspnœa, but a faint tracheal quality of the respiratory murmur could be heard at the upper sternum. Stertor developed before death, but was probably largely cerebral.

The autopsy revealed a general dilatation of the transverse portion of the arch, but with two more localized dilatations, one extending to the right, the other to the left. The first of these compressed the *vena cava superior*, and was adherent to it, forming a round bulging into the interior of the vein, corresponding with the middle and upper third of this vessel. On the summit of the bulging there was a rounded aperture of communication a quarter of an inch in diameter, and an inch and three-quarters beneath the origin of the innominate vein.

Another instance of varicose aneurism of the aorta and superior vena cava is reported by R. Sisley (*Lancet*, 1889, i. 1184). The patient, a man, thirty-five years of age, laborer, had but an indistinct history of syphilis, and was not intemperate. For some months he had had a cough, but did not complain of shortness of breath. His eyelids were puffy and his face somewhat

swollen on returning from work in the evenings. This condition was only seen at night, and had always disappeared by the morning. Upon one occasion he did not feel as well as usual, and stopped at St. George's Hospital for advice; but he did not consider himself seriously ill, and wished to go home. His face and neck were at this time deeply cyanosed, his eyelids puffy, and his ears almost black. His arms were slightly cyanosed, but the other parts of his body were of a natural color. A double murmur was heard over the middle of the sternum. His mental state was clear, but he was drowsy. He complained of no pain and had no paralysis. The cephalic and jugular veins pulsated.

The diagnosis of an aortic aneurism pressing on the superior vena cava was made. The patient was bled to sixteen ounces, but without relief, and there was considerable difficulty experienced in stopping the hemorrhage. His face and arms became gradually more cyanosed, and he became more drowsy, and finally comatose, and died in about two hours after admission to the hospital.

The autopsy revealed a saccular aneurism three-quarters of an inch above the posterior leaflet of the aortic valve. The opening into the aorta was of a rounded form and one and a quarter inches in diameter. Beyond the opening the sac measured about one and a half inches in its transverse diameter, and two inches from above downward. The aneurism extended between the walls of the aorta and the right ventricle as far downward as the interventricular septum, and upward to a point three-quarters of an inch below the opening of the innominate artery. About the centre of the right posterior part of the aneurism there was an opening into the vena cava immediately above the entrance of that vessel into the right auricle. The opening was of an irregular form, while its edges were ragged and thin, and projecting slightly into the vena cava. The sac contained a small, non-laminated clot, not adherent to the walls.

The author believes that the œdema of the face which the patient often had after a hard day's work, was due to the pressure of the aneurism on the superior vena cava. The final catastrophe was caused by the rupture of the aneurism. He makes a very brief allusion to other instances of this form of varicose aneurism. He accounts for its rarity on anatomical grounds, viz., that to produce it, two layers of pericardium have to be broken through, and adhesions must have been previously formed between the layer covering the aorta and that covering the vena cava, else the rupture would be intrapericardial.

A New Method for the Approximate Quantitative Estimation of Albumin in the Urine.

A. Christensen (*Centralbl. f. klin. Med.*, No. 30, 523, 1889, from *Virch. Arch.*, cxv. H. 1) recommends the following procedure: The urine containing albumin is precipitated with a dilute solution of tannic acid, and the precipitate thus obtained suspended in a definite quantity of water, by the aid of a small amount of a solution of gum arabic. In this way a quite permanent homogeneous emulsion is produced.

To find the quantity of albumin in the emulsion, we determine the degree

of its opacity. For this purpose there are required (1) a burette, and (2) a cylindrical glass of exactly four centimetres in diameter. This latter is placed over a piece of white paper, on which a series of black lines, each of a definite breadth, have been made at a definite distance from each other. After the emulsion has been diluted to a certain extent it is poured from the burette into the glass until the lines on the paper can no longer be distinguished from each other. The albumin present is calculated from the quantity of fluid which it was necessary to employ. The author has tested this method and finds it quite accurate as well as practical. It has been found, however, that there is a certain amount of error on account of differences in the intensity of the light and in the individual ability of the observers to distinguish the lines.

Safranine—A New Reagent for Sugar.

Grismer (*Annales de Soc. Méd. Chir. de Liège*, May, 1889, quoted in *Manchester Med. Chronicle*, x. No. 3, 211, 1889) recommends that as a test for sugar 1 c.c. of urine be boiled with 5 c.c. of a solution of safranine (1 : 1000) and 2 c.c. of a solution of caustic potash. If decolorization be detected, the urine is diabetic; normal urine containing too little sugar to decolorize completely so much of the reagent. On cooling the solution becomes turbid. The author considers this reagent superior to Fehling's solution, because it is not decolorized by uric acid, creatinin, chloral, chloroform, peroxide of hydrogen, or the salts of hydroxylamine, all of which reduce the Fehling's fluid, and thus lead to an error in diagnosis. It is true that chloral and chloroform attenuate the red color of the safranine, but never to a complete decolorization. On the other hand, albumin decolorizes it wholly, but only after some length of time. Occasionally normal urine will also do this, but the author believes that it then contains a little sugar, for on submitting it to the fermentation test such a specimen will show bubbles of carbonic acid gas rising to the surface, no further decolorization being obtainable on adding more of the reagent.

The Detection of Gonococci.

J. Schuetz (*Münch. med. Wochenschr.*, xxxvi. No. 14, 235, 1889) describes the methods hitherto employed for the detection of gonococci in the blenorrhagic secretion, as consisting simply in the action of an aqueous aniline color, and the removal of the excess of the dye with water. Only in the method of Eschbaum is alcohol used for the differentiation, and even here the nuclei and other portions of the cell remain so deeply colored that the discovery of the microbes, when present only in small numbers, is a difficult matter. The attempts to produce an isolated coloring of the gonococci have failed on account of the fact that these cocci, in contradistinction to other varieties, are decolorized by most acids and by the Gram method. As, however, the gonococcus is not affected by acetic acid to so great a degree, the author recommends the following method as simple and effectual:

The carefully prepared cover-glass preparations are placed for from five to ten minutes in a cold, filtered, saturated solution of methylene blue in five per cent. carbolic-acid water. They are then washed in water, and afterward placed for a moment (as long as it takes to count one, two, three, slowly) in a

solution of five drops of acetic acid in twenty cubic centimetres of distilled water, and at once again washed thoroughly in pure water. Everything in the preparation is now decolorized except the gonococci, which remain distinctly blue. It is now well to double-stain the preparation with a very dilute watery solution of safranine. The action of this color must be slight only, and be at once interrupted as soon as the cover-glass, after being washed in water, shows a trace of the safranine color when held over a white surface. Under the microscope the safranine will be distinct enough. These preparations may be permanently mounted in Canada balsam, which has been warmed on the slide without the addition of any solvent. The gonococci will be found deep blue, and the epithelial cells of the same color; while the pus cells and their nuclei are salmon-colored.

SURGERY.

UNDER THE CHARGE OF

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Transfusion.

Dr. William Hunter (*The British Medical Journal*, July 27, Aug. 3, and Aug. 10, 1889) publishes an elaborate experimental and critical study of the value of the different forms of transfusion. The paper is by far the most valuable recent contribution to this subject, and well deserves careful study. His main conclusions as to the practice of transfusion, and the reasons therefor, are:

1. Transfused blood possesses no nutritive value. Transfusion of blood is, therefore, useless in all forms of "atrophic" anæmia, by which term, rather than by the unfortunate term "symptomatic," hitherto given, he would distinguish all forms of anæmia in which the changes in the blood simply correspond in degree to the wasting changes occurring in other tissues.

2. If the condition to be met with is a want of red corpuscles, or an incapacity on the part of those already present to carry on their respiratory functions, then transfusion of blood may possibly be of value. The red corpuscles transfused remain for a certain time within the circulation of their host. Transfusion of blood may conceivably be of value in carbonic oxide poisoning, where the red corpuscles are incapacitated for their work by a close union of the gas with the hæmoglobin of the corpuscles.

3. If the condition to be met with is a failure in blood formation, due, perhaps, to the want of iron in the system, transfusion of blood may be of some value, in so far as we in this way supply the organism with iron in the form in which it can most conveniently be stored up in the body. The two

conditions in which this disturbance is most marked are chlorosis and traumatic anæmia resulting from long-continued and repeated hemorrhages. There is no disease in which transfusion of blood corpuscles is theoretically more indicated than in chlorosis. The anæmia of chlorosis we can, however, readily combat without having resort to transfusion.

The question as to the advisability of transfusion in traumatic anæmia is not so easily answered. Our object here is not so much to relieve any passing danger arising from insufficient bulk of fluid, or want of red corpuscles, as to stimulate blood formation. The recovery is effected with greater rapidity when simple saline solution (three per cent. solution of common salt) is injected than when blood is transfused. Dr. Hunter's experiments show that the recovery after transfusion of saline solution is remarkably rapid.

The time required for the return of the red corpuscles to their original number after loss of blood, without subsequent infusion or transfusion, varies from two to three weeks. With subsequent infusion of simple saline solution it is the same; whereas, with subsequent transfusion of blood, complete recovery is delayed a week longer or more. Further, what is perhaps more striking, and certainly is of more importance, is the fact that during the subsequent recovery the animal generally appears to be in better health after infusion of salines than after transfusion of blood.

Even in traumatic anæmia resulting from long-continued losses of blood, transfusion of blood has, in all probability, no value not possessed by simple saline solution. The former may actually retard blood formation; the latter is at least always harmless, and might be beneficial if it were required.

4. Lastly, if the condition to be met in transfusing blood is a threatened failure of circulation as the result of sudden loss of blood, then it is unnecessary to have recourse to blood transfusion, as infusion of any neutral saline meets equally well, if not better, all the indications. The value possessed by transfused blood in such cases is almost solely in virtue of its physical properties. The chief physical property of blood for purposes of transfusion is undoubtedly its volume. The immediate source of danger from sudden loss of blood is the fall in the blood pressure to a point where the circulation is unable to be maintained.

The obvious indication, therefore, is to raise the pressure within the vessels. In health, the blood pressure is dependent mainly upon peripheral resistance. The effect of a loss of blood on the blood pressure is, up to a certain point, completely neutralized by an increase in the peripheral resistance, due to stimulation of the vasomotor centre. It is only after very severe hemorrhage that this relation between the vessels and the amount of fluid they contain, necessary for the carrying on of the circulation is disturbed. The readiest way in which this can be restored is to replace the lost blood with a certain bulk of fluid. To meet the danger thus arising, the quantity of blood is of more importance than its quality.

In an emergency the infusion of ordinary water (Coates) has been followed by results as successful as any ever obtained after transfusion of blood. Bulk for bulk, pure or defibrinated blood, however, must possess certain advantages over neutral saline solutions free from organic constituents. They doubtless possess a certain physiological value as well as a physical value, inasmuch as blood must have a greater and more immediate effect in restoring the tone of

the vasomotor centres than saline solutions. These advantages, however, are more than neutralized by the other and still greater advantages, namely, (1) the difficulty of obtaining blood in sufficient quantity, or with sufficient rapidity, as compared with the ease with which simple saline solutions can be prepared; (2) the dangers attending the transfusion of blood, as compared with the absolute freedom from danger possessed by solution; and (3) the doubtful value of the transfusion, whether hæmogenic or physical, when compared with saline solution.

Transfusion of blood will long continue to be practised, and its action studied, on account of the many interesting problems connected with the physiology and pathology of the blood, on which it is well fitted to throw light. For practical purposes, however, all the advantages to be gained by transfusion may be equally well and more readily obtained by infusion of a neutral saline, such as three to four per cent. solution of common salt (about one drachm to the pint). The only pressing indication for the performance of transfusion is the collapse from sudden and severe loss of blood. With regard to its performance, two points may be noted: (1) That the simpler the instruments used—a simple glass canula, with a piece of India-rubber attached, and a clean syringe—the more easily will this infusion be effected, and the less likelihood will there be of the injection of air—a source of danger to which far too much importance has long been attached, as it is also one which can readily, with a little care, be altogether avoided; (2) that the temperature of the solution should never arise above that of the body. Under no circumstances is transfusion of milk or of other mixtures possessing what are supposed to be nutritive properties, ever indicated. They possess no value not possessed by an equal bulk of saline solution.

The Treatment of Surgical Shock.

F. X. Dercum (*The Medical News*, September 21, 1889) recommends the following methods of treatment in surgical shock, which he believes to be due to a more or less marked general paralysis of the nervous system:

If the surgeon is about to perform a serious operation, say trephining of the spinal canal with possible opening of the dura, a preliminary rest of several days in bed should be prescribed, to diminish general nervousness and irritability; secondly, excessive care should be used in the administration of ether, the very least possible amount being given; thirdly, etherization being complete, one-twentieth to one-tenth of a grain of strychnia should be injected hypodermatically, and repeated if necessary; fourthly, the operation being complete, and the shock established, the patient is to be at once transferred to a previously prepared hot-water bed, the head being maintained a little lower than the body. Shock continuing unabated, digitalis and atropia are next to be used hypodermatically, and at the same time musk may be injected into the bowel in the dose of fifteen to twenty grains, suspended in mucilage. If the latter is not to be obtained, warm, strong, black coffee is to be used in its stead.

The hypodermatic injection of ether he does not believe to possess much utility. If it acts at all, it must be in a reflex way by the local irritation it produces.

The Surgical Aspect of Tuberculosis.

Mr. Howard Marsh's lectures (*The British Medical Journal*, July 20th and 27th, August 3, 1889) on this subject, before the Royal College of Surgeons, are, as might be expected, valuable contributions to its literature, and, moreover, are marked by the careful clinical observation and sound judgment which just now are so necessary to aid in settling some of the vexed questions as to operative or non-operative treatment of tuberculous joints. In this respect the following remarks of Mr. Marsh have the greatest practical importance:

"Speaking of the general group of tubercular diseases met with in surgery, I believe that when they are detected early, and are adequately treated by prolonged rest, in not more than at the most ten per cent. do they develop to any formidable degree. It is a rule to which I have seen but few exceptions, that when, for example, a knee or an elbow, which is the seat of tubercular disease of less than three months' duration, is enclosed in well-fitted splints, and is kept at rest, the case gives no further real trouble. The symptoms begin at once to subside, and the improvement, though it is slow, goes on without material check until the joint is apparantly free from disease; while, after a longer period of rest, complete recovery is secured. I am confident that the period required for treatment in early cases does not, as a rule, exceed twelve or eighteen months. I have met with many instances in which after this time no trace of disease, beyond slight muscular wasting, has remained. In more advanced cases, though the period occupied is longer, the same treatment will lead to good repair.

"The treatment adopted has been that of prolonged rest in the horizontal position, combined with weight-extension of the affected limb. This method, although, of course, it involves some important details, is, in principle, so simple and so well known that it is needless to describe it; but the method of dealing with suppuration claims more particular notice. All abscesses have been opened as soon as detected. An incision from an inch to an inch and a half in length is made, matter is evacuated by gentle pressure, and a small drainage tube, just long enough to enter the cavity, is used for two or three days. The dressing has consisted of carbolic gauze, next the wound, and this has been covered superficially with alembroth wool. The dressing is changed according to the case. In many instances the wound closes in a fortnight or three weeks, sometimes even sooner; in others it becomes a sinus, which discharges for a month or six weeks, and then heals; in others, again, suppuration remains free for several weeks, or even longer, and further openings have to be made; but at length, in a large majority of cases, the wound heals, and no further suppuration, except in a very few instances, takes place.

"I am aware that the question whether abscesses should be opened at once is still under discussion. It is well known that, if left to burst spontaneously, they often do so quietly and without accession of fever or constitutional disturbance; but they have been opened in the cases I am alluding to (1) because, as experience amply shows, if left they frequently steadily enlarge, and lead to wide infection of the surrounding structures, and to the develop-

ment of long devious sinuses, which become themselves lined with tubercular growth, and the seat of long-continued and exhausting suppuration, attended with the maintenance of a high temperature; (2) because, by the method of incision, draining, and careful dressing, these abscesses may be safely evacuated without the occurrence of those septic changes and their results—hectic, high temperature, and wasting, which formerly were so liable to be met with—so that the period and also the dangers of suppuration are very materially curtailed.

"It is true that such abscesses may be absorbed; indeed, their absorption, I believe, is more frequent than some observers might think; but this event is, after all, so rare that it ought not to be allowed to interfere with any general rule of practice.

"I am sure, from considerable experience of both methods, that evacuation by free incision and drainage is much to be preferred to aspiration; for although some abscesses, when once emptied by the aspirator, will never refill, this is not the case with the majority; the majority commonly fill up again every week or every fortnight, and at length have to be incised, while, in not a few, septic changes occur after aspiration, so that this method is certainly not materially, if it is at all, safer than the free incision I have described."

Mr. Marsh, continuing, reviews the results of excision, mentions the reduction in mortality already effected, and adds:

"I do not doubt that, as operative surgery improves, the immediate results of excision will be greatly superior to those I have referred to. This is foreshadowed by the results reported by Mr. Barker and Mr. Pollard. They will be so good, indeed, especially when the operation is performed early, that unless the results to be obtained without operation are kept well in view, excision will, as I venture to think, be much too commonly performed. It must be remembered that the mere healing of a wound does not show that an operation was the best thing for a patient, or affords any proof that it ought ever to have been undertaken. The main defect of excision will lie in the ultimate result, as regards the usefulness of the limb, when this is compared with a limb in which no operation has been performed, and in which the joint, instead of having been removed, has been restored to that considerable degree of usefulness which can generally be secured by rest. I believe it is now recognized by most surgeons that, although the immediate result of excision of the knee in children may be all that could be desired, the wound often healing by primary union, or at least very quickly, the ultimate result is unsatisfactory. The union between the bones gradually, in many instances, yields; the bones do grow imperfectly, deformity ensues, and the functions of the limb are materially interfered with. It will, I venture to think, be much the same in the case of the hip. The wound may heal by primary union, and the earlier the operation the more probable will this form of union be; but deformity will often ensue, and the limb in many cases will be weak and deficient in usefulness. In short, it will be seen in both cases alike—in the knee and in the hip—that when one of the principal joints of the lower extremity has been removed during childhood, the patient has been seriously crippled."

Syphilis in Old Age.

Dr. Alexander Renault reviews the subject of senile syphilis in the *Annales de Derm. et de Syph.*, March, April, May, 1889, and calls attention to the differences which characterize this form of the disease. These differences are apparent even in the course and duration of the primary sore. The chancre has at first much the same appearance as that in persons of any age, but it has a remarkable tendency to ulceration. This is a point of some importance, since it is liable to lead to an error in diagnosis, especially if the chancre be extra-genital, for it may in such cases readily be confounded with epithelioma, which is so common in old age. Cicatrization is also slow, many months sometimes elapsing before this process is complete.

Another point worthy of notice is the tardiness in the appearance of adenitis. In the adult this makes its appearance usually within a fortnight, while in the aged its development is often a matter of six or seven weeks. But it is during the secondary period that the peculiarities of senile syphilis are the most striking. The syphilitic fever is apt to be quite marked; indeed, the condition of the patient at this time is sometimes so grave as to give occasion to the diagnosis of typhoid fever, or of profound malarial infection.

The syphilides of the secondary period are distinguished by their tendency to become confluent; by their obstinacy and resistance to ordinary therapeutic measures; by the frequency of relapses, and, finally, by a remarkable proneness to assume the characteristics of tertiary eruptions. Cutaneous gummata are not uncommonly observed at this stage, and in general they appear much earlier in the aged than in adults. On the part of the nervous system the disturbances are often most marked. Disorders of sensation and motion, of the special senses of sight and hearing, and of the mental functions, are commonly met with at this period. And, finally, a profound anæmia and a most pronounced cachexia are often seen, and, indeed, may be regarded as characteristic of the secondary stage of senile syphilis.—*The Medical Record*, September 28, 1889.

Lumbar Hernia.

Mr. Jonathan Hutchinson, Jr. (*The British Medical Journal*, July 13, 1889) exhibited at the Pathological Society the only specimen of lumbar hernia in existence in London. It was obtained from an elderly and rather emaciated man, who died (from other causes) in the London Hospital. The hernia was about the size of one's fist, was situated in the left lumbar region, lying over Petit's triangle, and extending nearly from the last rib to the iliac crest, and it had existed for some years. It could be made to diminish markedly on pressure, was resonant to percussion, and had an impulse when the patient coughed. Gurgling could be detected when reduction was made, returning when the pressure was taken off. It caused the patient no pain, and hardly any inconvenience. It was naturally thought that the hernia protruded through the orthodox triangle, but it was found, on dissection, that this was not the case, as the aperture, which would admit two fingers and was circular in shape, was really situated above and to the inner side of the triangle. The protrusion was, in fact, just outside the quadratus lumborum, through the transversalis aponeurosis and the latissimus dorsi, where the

latter arises from the strong fascia covering the erector spinæ. Another interesting feature at the post-mortem examination was the absence of any peritoneal sac. The looseness of the attachments of the peritoneum in this region is well known, and is taken advantage of in certain operations, such as removing the kidney through a lateral incision. It was quite easy to make the peritoneum, by gentle pressure, protrude into the centre of the hernial tumor, and, as it was certain that it had habitually during life contained intestine, it is obvious that every time the latter was reduced the peritoneal sac must have returned with it into the abdominal cavity. Whether this feature has been present in other cases of lumbar hernia it is impossible to decide, but it is one rarely met with in connection with the more common varieties of rupture.

Ether Irrigations in Strangulated Hernia.

Dr. Ivan N. Drakin (*The Annals of Surgery*, August, 1889) eulogizes ether irrigations as an excellent means for reduction of strangulated hernia. He simply pours a teaspoonful of ether over the hernial tumor every quarter or half hour, keeping it covered with compresses during the intervals. As a rule, after three or four tablespoonfuls, the intestinal loop slips down into the abdominal cavity by itself; in some cases, however, slight pressure should be applied. In the case of incarcerated scrotal hernia, it is advisable to irrigate with a mixture of ether (twenty parts) and hyoscyamus oil (four parts). When applied sufficiently early, the method is said to give most brilliant results.

Dr. A. J. Brustein (*Ibid.*) describes the case of a woman with an incarcerated umbilical hernia of the size of a man's fist, in whom, after all ordinary procedures for reduction had failed, irrigation with a small jet of ether was resorted to, taxis being continued at the same time. In three or four minutes the reduction was effected with striking ease. The action of local etherization was attributed to a rapid contraction of the intestinal wall, and to the diminution in volume of the hernial gaseous contents caused by the sudden lowering of temperature.

The Extirpation of Varices of the Lower Extremity.

Dr. Bœnnicken reports (*Berliner klinische Wochenschrift*, September 23, 1889) the latest details and results of the method of total excision of varicose veins originally proposed by Madelung, in 1884, at the Congress of German Surgeons. On that occasion both Langenbeck and Schede took part in the discussion, the former opposing, the latter upholding the procedure. Since then but little attention has been paid it by English and French surgeons. König says (1886) that he has given up the ligation and limited excision of the veins, as the best results are obtained from much more extensive operations. Riedel (1885), while deploring the tediousness of the operation, expresses the same opinion. Holtz and Schmid-Stettin (1887) recommend it, while Tillmans, Fischer, and Landerer (1888–89) speak of the certainty of return.

Bœnnicken has operated on thirty-two cases, fourteen of which he now reports as remaining cured two years afterward; the others are more recent, and are not included in his statistics. In none of these was there any serious

illness or even inconvenience after the operation. The presence of ulceration was not regarded as a contraindication.

The steps of the operation are briefly: cleansing of the skin; curetting and disinfecting of the ulcer, if there be one; occasionally the latter is surrounded and isolated by an incision, and this is especially necessary if the peripheral portion of the enlarged veins runs across or into the region of ulceration. The wound then makes them easily recognizable. The limb is then allowed to hang over the edge of the table until all the subcutaneous veins stand out; an Esmarch tube is applied loosely at the upper third of the thigh, so as not to interfere with the arterial supply; the skin is again cleansed; an incision in the long axis of the extremity, and following the course of the enlarged vein (generally the long saphena), is then made. This must usually be from one and a half to two feet in length. The skin is then turned back for a hand's breadth on either side. The main trunk is seized above and below with hæmostatic forceps; the intermediate portion with the branches is rapidly isolated by blunt dissection; the veins must sometimes be followed below the fascia and into the muscle. The main trunk is ligated above and below; the venous plexus removed, a few ligatures (two to four) applied; the corners or pockets of the wound drained with small rubber tubes; the skin closed by a continuous suture; an antiseptic dressing and firm bandage applied, and the limb kept in vertical suspension for twenty-four hours. Union generally occurs by first intention. The symptoms of the varicose condition, the feeling of fatigue, the pain, the muscular cramps, etc., as well as the eczema and ulceration, are usually entirely cured.

The Surgery of the Spine.

Dr. J. William White (*The Annals of Surgery*, July, 1889) reviews the history of spinal surgery from early times to the present day, discusses the arguments for and against operation in the three great classes of spinal disease, in which operative interference may be thought of—viz., traumatisms, caries, and neoplasms—and comes to the following conclusions:

1st. The objections urged against operative interference in spinal traumatisms were partly theoretical—hemorrhage, frequency of absolute destruction of the cord, pressure from inaccessible fragments of bone, etc., and have been shown to be unsupported by clinical facts; and were largely due to a well-grounded dread of, (*a*) the shock, in those cases operated on in pre-anæsthetic times; and, (*b*) consecutive inflammation, suppuration, and pyæmia in pre-antiseptic periods. The later results, which now constitute our only safe basis for generalization, are distinctly encouraging, and resections of portions of the vertebræ, in fractures, possibly even in dislocations, should be recognized as an eminently proper operation, and in suitable cases altogether warranted by the facts in our possession; and, further, such cases are by no means rare or exceptional.

2d. There can be still less doubt that the testimony of both pathologists and practical surgeons indicates that the causes of the paralysis of Pott's disease is in many instances an extra-medullary proliferation of connective tissue, assuming the density and proportions of a neoplasm, occupying the space between the dura and the anterior surface of the laminæ, not apt to be

associated with intra-medullary changes or with destructive degeneration of the cord, and very frequently removable by operation.

3d. Every case of focal lesion thought to depend on a tumor and not distinctly a malignant and generalized disease, should be regarded as amenable to operative interference, no matter how marked the symptoms of pressure may be, nor how long continued.

4th. The method of extension as recently revived is well worthy of preliminary trial in the first two classes, and in obscure cases thought to belong to the third class. It has not yet been tried in a sufficiently large number of cases to establish its exact limitations, but it is unquestionably a therapeutic measure of vast importance in spinal injury and disease.

5th. It is customary and proper in deciding upon any serious surgical procedure, involving risk to life, to consider well the prospects of the patient in the event of non-interference, and to be largely influenced by them. Looked at in this light, the surgery of the spine, as regards traumatisms, caries, and neoplasms, may fairly be said to have a rapidly widening field, and to deserve more serious and careful consideration by practical surgeons than it has received for many years.

Drs. F. X. Dercum and J. William White (*Ibid.*, June, 1889) reported two cases of resection of the spine. One died soon after, but the other, who had been for many months a hopeless paralytic, and who was rapidly failing in general health before the operation, is now (October 6, 1889) walking about the ward unassisted and in excellent general condition.

Oblique Osteotomy for Anterior Curvature of the Tibia.

Dr. Joseph Collier describes as follows (*The Medical Chronicle*, August, 1889) the operation which he prefers in exaggerated cases of tibial curve. It was originally proposed by Mr. Gowan. Neither Esmarch nor tourniquet is required, as the bleeding is only slight, and what little does occur is useful in keeping, by its flow, the wound clean during the operation. The position of the centre of the osteotomy should be at the middle of the convexity of the bone. A tenotomy knife is entered at the anterior border of the tibia and passed under the skin across the subcutaneous surface of the bone and then withdrawn. An Adams's saw is introduced through the puncture and made to follow the track of the knife. The tibia is then sawn through obliquely in a direction from above and within downward and outward. The skin is tolerably movable on the front of the shin, so by pulling it up on entering the saw and gradually dragging it down as we get lower with the oblique division of the bone, it is possible to do the operation through merely a skin puncture. The amount of obliquity must depend on the amount of curve and flattening. If these be at all great—as, for instance, if in a child of from seven to nine years the point of greatest convexity be over two inches in front of the normal—then the obliquity required will be in a line forming an angle of about 60 degrees with the horizontal. In most cases it is good to divide the fibula as well, and this may be done with the saw either through a separate puncture or through the puncture used for division of the tibia by first reëntering the tenotomy knife and passing it through the soft parts to the external surface of the fibula. Lastly, the tendo-Achillis is to be subcu-

taneously divided; it is in every case well to do this, as it enables the deformity to be more easily removed; it relieves tension and pain after the operation, and lessens the tendency to displacement during repair. The tibia should be sawn through, or almost through, for if much bone is left to be fractured, it may break irregularly and projections may interlock and prevent good positioning.

Such an oblique osteotomy as the above, by allowing the lower fragment of the tibia to slide up, as so often happens in oblique accidental fracture of that bone, and especially by allowing an antero-posterior movement of the fragments upon one another in a transverse horizontal axis, will be found to permit a ready and complete reduction of the deformity. The wound having been dressed, the limb should be put up in a back and side splint. It should be taken down at the end of from a week to ten days, when the wound will be found healed; under an anæsthetic the limb may then be moulded into accurate position and fixed in plaster-of-Paris. Any little projection from the sliding up of the lower fragment will soon be absorbed and disappear. If the curve has been excessive, the removing of the deformity in this special manner will of necessity leave the limb with a little possible hyper-extension.

The Effect of the Entrance of Air into the Circulation.

Dr. H. A. Hare (*The Therapeutic Gazette*, September 16, 1889) has made a series of experiments which, he claims, show that the admission of air to the jugular vein is not dangerous unless it is in enormous quantities, while, on the contrary, a much less amount injected into the carotid artery causes death. His theory as to why air injected into the jugular vein is not followed, unless in excess, by bad symptoms, while the same doses kill when sent into the carotid artery, is, that the air in small amount on entering the right side of the heart is, when sent through the pulmonary bloodvessels, expired with the rest of the gases therein contained; and it is only when so large an amount is injected that some of it reaches the left side of the heart that death ensues, owing to the formation of minute clots which act as emboli. That such clots are not formed in the jugular vein he thinks probable from the results reached and from the fact that venous blood coagulates more slowly than arterial blood. The injection of large amounts of air into the carotid where arterial blood is present may cause clots and resulting emboli —a theory, he thinks, still further supported by the symptoms of paralysis or spasm shown by the animals used. It can hardly be supposed that air is a poison in itself to the brain and its centres, particularly the respiratory centre. His conclusions are that—

1. Death never occurs from the entrance of air into the ordinary veins of the body, unless the quantity be enormous—from one to several pints—a quantity which cannot enter unless deliberately sent in by the surgeon.

2. The cases on record have been due to other causes than air, and have not been proved.

3. The tendency of the vessel to collapse and the leakage of blood prevent entrance of air, and it would seem probable that a clot has generally caused death, not the air itself.

[These results are contradictory to those reached by SENN in an elaborate experimental and clinical study of this subject (*Trans. of the Amer. Surg. Association*, vol. iii., 1885), and are directly opposed to hitherto published clinical cases. Among the conclusions reached by Senn were the following: Clinical experience and experimental research teach us that when a certain amount of air enters the right side of the heart, death invariably takes place in a very short time. Insufflation of a fatal quantity of air into a vein produces death by—*a*, mechanical over-distention of the right ventricle of the heart and paralysis in the diastole; *b*, asphyxia from obstruction to the pulmonary circulation, consequent upon air-embolism of the pulmonary artery. Insufflation of the same quantity of air into arteries is *less* dangerous than when introduced into veins.—ED.]

OPHTHALMOLOGY.

UNDER THE CHARGE OF

GEORGE A. BERRY, M.B., F.R.C.S. EDIN.

OPHTHALMIA PHOTO-ELECTRICA.

The last number (May–June) of the Russian *Vestnik Ophtalmologii* contains an interesting treatise by DR. LYOUBINSKY on the little-known affection of the eyes which is produced by incautious exposure to a strong electric light. Until the electric light came into use strong sources of illumination did not constitute any factor of etiological importance in the production of eye diseases; hence the subject is one which has only comparatively recently received attention. Those suffering from the effects of exposure to the strong light are almost exclusively professionally connected with electric lighting.

Dr. Lyoubinsky, practising as he does at Cronstadt, has had unusual opportunities of seeing what he has been in the habit for many years of calling ophthalmia photo-electrica. He has met with this affection thirty times, most frequently amongst officers connected with the naval school at that port. The light which has proved most particularly hurtful is the so-called "fighting light" of 14,000 candles power, the strength of which can be appreciated by the fact that it is almost impossible to look at it from Oranienbaum, a distance of seven versts (about 4½ miles). Dr. Lyoubinsky was consulted ten years ago as to the best means of protecting the eyes against those strong lights, and then recommended the use of dark-red spectacles which excluded the blue and violet rays. But as many men complained of discomfort from heat on wearing these spectacles, he began a series of experiments which led him eventually to advise either dark blue or dark gray glasses for those who disliked the dark red ones. The practical drill in connection with the electric light takes place during the day and lasts for an hour and a half. Those who suffer have incautiously looked at the glowing carbon for a minute or so

without any protection. Recurrences are not infrequent, and it appears that when the eyes have been once affected the susceptibility is greater.

The following are the symptoms of the affection: For some time after the eyes have been exposed to the light the patient complains of seeing white objects yellow, or he may merely experience some discomfort or pain in the eyes. These sensations pass off, and for the rest of the day the eyes remain quiet. Great pain, however, comes on again at night, with a feeling of sand in the eyes, and excessive heaviness of the lids. At the same time there is profuse lachrymation, and the photophobia is so great that the patient cannot even bear any light with the eyes closed. The objective examination during this stage is extremely difficult, often practically impossible; the lids are greatly swollen, and the conjunctiva hyperæmic. This state of matters lasts for one and a half to three hours, when the patients are able to sleep, and awake in the morning perfectly well, only experiencing, as a rule, some slight discomfort in the eyes, from which, however, if the conjunctivæ have been previously healthy, there is neither excessive tear-flow nor any abnormal discharge. In some cases there is a recurrence of the same symptoms during one or two nights.

The ophthalmoscopic examination on the day after an attack usually reveals nothing more than some degree of hyperæmia of the disks; the cornea and other parts of the eye are normal. In one severe case, after four attacks, Dr. Lyoubinsky found a number of small, mostly circular, yellow spots in the neighborhood of the macula, which did not appear to give rise to any appreciable scotoma. He believes that, notwithstanding the absence of visible changes in the retina, such changes do play an important part in the peculiar ophthalmia described. But, as the retina is practically insensitive, pain is experienced from the other parts of the eye affected at the same time.

The author refers to the great similarity between the symptoms of electric-light ophthalmia and snow-blindness, the main difference being the comparatively short duration of the former.

Corneal Astigmatism after Cataract Extraction.

At the last meeting of the Italian Ophthalmological Society, which was held at Naples, Scimemi gave the result of his investigations into the cause of the astigmatism which may be produced after the extraction of cataract. His paper is published in the *Annali di Ottalmologia*, xviii., 2, from which this abstract is taken.

One hundred and forty-six eyes were examined, some several times at different intervals by means of Javal and Schiotz's ophthalmometer. As is well known, the astigmatism when produced is due almost always to a flattening in the meridian of the cornea perpendicular to the line of section made for the extraction of the cataract. According to Weiss, this flattening is caused by a faulty apposition of the lips of the wound, which, instead of uniting in their entire thickness, do so only in part and in such a manner that the anterior edge lies in front of the other. Becker has shown, by anatomical examination of eyes on which extraction had been performed, that healing does occur in this manner, and he has found that the difference may be as much as 0.20 m.m. Weiss has further calculated that a difference

of 0.12 m.m. would give rise to a flattening which would cause an astigmatism of 2.0 dioptrics; one of 0.30 m.m. a flattening corresponding to 5.5 dioptrics of astigmatism. The point in which Scimemi's observations differ from those of Weiss and a few others who have investigated this matter, is in the demonstration of an alteration of curvature of the meridian parallel to the corneal section. In this direction he has found that the curvature is frequently increased and, indeed, that in many cases such increase of curvature is often a much more important element in the causation of the astigmatism than the diminution in the direction at right angles. Further, he has found that this increased curvature exists in cases when no appreciable difference in level exists in the edges of the wound of the cornea.

Scimemi gives the following explanation of the changes which give rise to the astigmatism. These three changes, viz.: The shortening of the diameter of the cornea parallel to the section, the elongation of that perpendicular to the section, and the displacement of the lips of the wound are, he believes, all due to the action of the recti muscles on the eye. In the normal state of matters, owing to the incompressibility of the fluid in the anterior chamber, the contraction of these muscles exerts little or no influence in altering the shape of the cornea; but it is, he thinks, otherwise when a large wound has been made in the cornea. The lateral recti under these circumstances compress the cornea in the meridian of their action, while the action of the vertical muscles may be supposed to flatten the vertical meridian and displace the lips of the wound. Perhaps the most practical point to be gathered from these investigations of Scimemi, should they be confirmed, is, that the position of the section is not likely, as many have supposed it has, to have any influence on the degree of the resulting astigmatism.

A New Treatment for Panophthalmitis.

The treatment adopted in cases of panophthalmitis differs in the hands of different ophthalmic surgeons. Some perform enucleation; others, considering that the slight risk which this entails is not justified, eviscerate or incise, or leave the eye more or less to take its own course. Dr. Chibret, of Clermont-Ferrand, has recently published in the *Revue Générale d'Ophtalmologie* viii. p. 5, a method of treatment based on the principle of removing only the suppurating tissues, and retaining those which have not been involved in the purulent inflammation.

Having made a large opening in the lower portion of the cornea, and with the point of the knife fully detached the iris and exudations lying in the pupil, he injects a solution of oxycyanide of mercury 1 to 1000 into the eye. The injection is made with an Anel's syringe, considerable force being employed, and is continued until the liquid, after dislodging all the suppurating elements of the eye, returns perfectly clear. A short description of five cases in which this treatment was adopted is given. The fever and pain were at once checked in all, and the patient could be discharged on the fourth or fifth day. The indications for preserving all those parts of the eye which have not been destroyed seem to be thoroughly and easily complied with, and the remaining stump is so free from any kind of irritation that Chibret considers that the danger of sympathetic inflammation probably does not exist—a point

in connection with which, however, sufficient experience has not yet been obtained. The proceeding is also recommended by Dr. Meyer, of Paris.

A Case of Permanent Conjugate Deviation of the Eyes and Head, the Result of a Lesion limited to the Sixth Nucleus; with Remarks on Associated Lateral Movements of the Eyeballs, and Rotation of the Head and Neck.

This case, which is recorded in the July number of *Brain*, by Drs. Hughes Bennet and T. Saville, is one of those rare cases in which a brain lesion is so definitely circumscribed that important, all but conclusive, evidence is afforded of the function of that portion which it has involved.

The case is, shortly, as follows: Woman, aged sixty-seven, sudden complete paralysis of left arm on awaking one morning; two months afterward, and without any improvement having occurred in this condition, she found again on awaking in the morning that her eyes and head were forcibly rotated to the right. The result of an examination, made three days later, was: "Both eyeballs were firmly and permanently fixed toward the right side, and the strongest efforts of the will could barely bring them toward the middle line, and in this the left eye was specially deficient. When each eye was tested separately the right could be moved to, and even a little beyond, the middle line, but the left did not reach that point. Both eyeballs converged when an object was brought close to them. The pupil was equal and normal. The head was firmly and permanently rotated toward the right, and could not voluntarily be brought into a straight position. The chin was tilted forward and upward, due to contraction of the left sterno-mastoid muscle." There was no hemianopsia, nor were there any ophthalmoscopic changes. The symptoms persisted until the patient's death, a month later.

Post-mortem. Besides an area of softening occupying the right ascending frontal, "on removing the pons and medulla, and making a transverse section exactly at their junction, a small flat circular patch of softening about one-tenth of an inch in diameter was seen occupying the position of the left sixth nucleus, and limited to it without apparently involving the neighboring structures, such as the facial fibres. Otherwise to the naked eye the appearances of the pons and medulla were normal." Slight traces of degeneration were found, too, in the left adducens.

There was, therefore, in this case complete destruction of the left sixth nucleus, and to this the authors are no doubt justified in ascribing, as they do, all the symptoms with the exception of the paralysis of the arm accounted for by the condition of the cortex, and the permanent rotation of the head to the right. The explanation given for this is that it was probably "due to direct irritation by the lesion in the sixth nucleus upon the neighboring eleventh nucleus, thus causing contraction of the muscle on the same side through the spinal accessory nerve. Hence, the head was tilted over the right shoulder. The sterno-mastoid remained permanently and rigidly contracted." The main function of the sixth nucleus is, therefore, apparently to regulate the associated lateral movements to the same side, and while its destruction leads to a loss of such associated movement it only produces complete paralysis of one muscle, the external rectus.

OTOLOGY.

UNDER THE CHARGE OF

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New Antiseptic Artificial Tympanic Membrane.

A new artificial membrana tympani, devised by Dr. John Ward Cousins, of London, is thus described in the *Lancet*, September 14, 1889:

"In shape it is exactly like a hat with a very high and tapering crown and a broad and flat brim, having a short ribbon attached to the edge. It is just firm enough in substance to retain its shape in the ear, and yet the material is so soft and flexible that it causes no sensation by its presence. It is stained a delicate flesh color, and is made in several sizes. When in position the crown rests near the tympanic membrane, the brim upon the wall of the meatus, and the little ribbon or handle behind the tragus. The material of which it is made is composed of compressed cotton fibre, swollen by prolonged immersion, and saturated in an antiseptic oil and ether. The soft material is then firmly compressed in a little machine designed for the purpose, and afterward dried by artificial heat. The instrument is very light, ranging from one-sixth to one-quarter of a grain in weight. It is inserted by means of a special probe, and is extracted by traction on the above-named ribbon or handle." This artificial membrane is also considered by its inventor as a protector and local antiseptic remedy. We are not given any facts as to whether or not this instrument improves the hearing.

Otology during the Past Year (1888).

This is the title of a long bibliographical article by Sigismund Szenes, of Budapest, which is published in the *Deutsche medicinische Wochenschrift*, September 12th of this year.

The most important articles mentioned by him have been noticed in this journal as they have appeared. Nearly all are from German sources; the few from English and American sources would seem to indicate great ignorance of what has been done in otology in these two countries within the last year. We would note what is said of an article by Gruber, of Vienna, in the *Monatsschrift f. Ohrenheilkunde*, No. 9, 1888, on foreign bodies in the ear. He reports two cases—one of a ball of cotton, and the other of a piece of garlic which had been placed in the ear—which had been improperly treated. In the first case, the physician who was first called on for treatment endeavored to remove the foreign substance with instruments, and was so rough in his manipulations as to set up an otorrhœa which lasted two months. In the second case, a permanent inflammation was excited in the auditory canal and in the drum-cavity, and finally symptoms of periostitis in the mastoid

process. Such cases are coming constantly under the aurist's notice, simply because the general practitioner forgets that he should syringe foreign bodies from the ear, and not grapple after them with instruments he cannot manage in a territory he is unacquainted with. Furthermore, it is not absolutely necessary that foreign bodies in the ear should be removed if they excite no unpleasant symptoms.

Among other diseases of the external ear may be named *othæmatoma*. Arndt (*Internat. klin. Rundschau*, No. 44, 1888) maintains that othæmatoma occurs when the reticular cartilage of the auricle is changed into hyaline cartilage, which can ensue locally or come about from some general systemic disease. As othæmatoma rarely heals without deformity (shrivelling) Arndt advises that it be treated by a protective dressing or bandage, so that the auricle is irritated as little as possible. After absorption of the extravasation of blood has occurred, the ear will maintain a good form. If the othæmatoma spontaneously bursts or is emptied by an incision, shrinking and puckering of the auricle will occur, and even true bone may form in the connective tissue.

The Tampon as a Dressing in Suppurative Diseases of the Middle Ear.

Dr. M. D. Jones, of St. Louis, Mo., has recently contributed an article on this subject in the *St. Louis Polyclinic*, August, 1889. The writer first considers the plan of antiseptic tamponading the ear as devised by Lœwe, of Berlin: "First syringe the ear carefully with a solution of creolin, carbolic or boric acid, then by means of cotton and inflation free the tympanum as far as possible from all moisture, and finally use the packing." Dr. Jones uses the packing not altogether for its aseptic properties, but largely for its drainage qualities as "the surgeon uses the drainage tube, since, when properly inserted, a tampon of absorbent cotton, by its capillary action, keeps the tympanum free from matter." Furthermore, compression is known to be a valuable aid in treating inflammation, and here the tampon acts well. The tampon as applied by Jones "is made by using small bits of cotton, and with the aid of the mirror, speculum, and probe, these are gently pressed into position, and a compact mass is formed, which supports uniformly the whole of the membrana tympani and walls of the meatus." This must be kept dry, should be removed daily, the ear cleansed, inflated, and a fresh plug inserted. Then inflation is advised again in order to bring the membrana evenly against the tampon to assist drainage. The tampon must not be too tight as it becomes painful; if too loose, it does not act as a drainer, but keeps the pus pent up and renders no support to the inflamed parts.

The Etiology and Treatment of Chronic Suppurative Catarrh of the Ear.

This is the title of a very valuable and interesting paper by Dr. H. Macnaughton Jones, in the *Lancet* for July 27 and August 3, 1889. The chief aim of the article is to call attention to the prevention of those frequent evidences of either ignorance or neglect in ear diseases rather than "to the hopeless endeavors to redeem lost time in restoring a shattered sense or res-

cuing a life that is doomed." The writer then reviews "the present position of otology both as regards ear-ferments and bacteria," and he then draws attention to the suitability of the ear-passages and cavities for the origin and completion of fermentative processes. There are found in the sinuosities of the various portions of the ear many of the conditions favorable to "life without air," as Pasteur defines fermentation.

A table is given of the causes of chronic suppurative discharges from the external and middle ear. From these tables "we perceive that, with few exceptions, we are confronted with conditions or diseased states that either owe their existence to, or are associated with, special microbes." Gout, indirectly by its tendency to produce a dermal swelling and a pasty secretion in the auditory canal, and eczema very rarely induce suppurative catarrh of the ear. "Sea-bathing is an undoubted source of chronic suppurative catarrh, a result, however, rather more frequently found in those who are fond of diving."

The practitioner must guard against accidental or "deliberate" introduction of the germs into the auditory bloodvessels or lymph-channels, by avoiding the use of oily substances in the external canal, or the introduction of dirty specula, undisinfected Eustachian catheters, bougies, etc. We must also avoid the use of cotton plugs in the ear, as they are heat-producing and moisture-absorbing, and act as "incubating pellets for broods of embryonic germs."

From the etiology of this affection, the prophylaxis should consist in preventing, if possible, the entrance into the blood of the aural structures, of the *materies morbi* of tubercle, syphilis, fevers, diphtheria, and erysipelas. This can be accomplished by therapeutic measures to control the action of the morbid elements in the blood and lymph.

In the second class, the local, we have to control locally the extension of the pathological processes, and the entrance of pathogenic germs into the middle ear, taking measures to destroy them and prevent their invading the underlying tissues. The writer most justly maintains that aural complications can be largely prevented in scarlet fever and diphtheria and other infectious throat diseases, by "early antiseptic treatment of the nasal passages and the nasopharyngeal region, not to speak of direct measures, such as paracentesis of the membrana tympani, when indicated." The treatment of adenoid growths in the nasopharynx, and local remedies for the ear, new growths in suppurations of the ear, and the so-called dry treatment by boric acid, are duly considered. The author avoids all drops in the ears in his practice, relying upon the dry form of treatment.

OBSTETRICS.

UNDER THE CHARGE OF

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The Use and Abuse of Antiseptic Injections in Obstetrical Practice.

Garrigues (*Transactions of the American Gynecological Society*, September 17, 18, 19, 1889) believes in the value of prophylactic douches before labor, and repeatedly during prolonged labors. If the hand or an instrument be introduced within the uterus during labor, an intra-uterine douche should be given. The material should be bichloride of mercury 1 : 5000, carbolic acid, thymol, salicylic acid, zinc chloride, or creolin. A glass vaginal tube is chosen for vaginal douches; a single tube for intra-uterine. The temperature should be 110° to 115° F.; the quantity two or three pints for intra-uterine, several quarts for vaginal. The uterus should be compressed after the douche, and the fluid drained from the vagina.

Lusk was in favor of prophylactic vaginal douches; intra-uterine douches were most successful where septic matter was retained in the uterus. In septicæmia, in which bacteria are the agents of poisoning, douches did no good; but only hastened the absorption of germs into the lymphatics. One intra-uterine douche, followed by an iodoform suppository, was all that is advantageous. Curetting the uterus, followed by douches, is occasionally useful. Typhoid fever he believed was not infrequently mistaken for puerperal fever.

Mundé examined the uterus with the finger for septic matter if symptoms arose. If discovered, he curetted the uterus and irrigated; ergot was then given, a cold coil placed upon the abdomen, and an antiseptic pad over the vulva.

A Case of Obstinate Vomiting of Pregnancy.

Wiesel (*Wiener medizinische Presse*, No. 29, 1889) reports the case of a primagravida whose vomiting became uncontrollable and her condition desperate. Constipation had also been present. Rectal injections of chloral and bromide, mixed with milk and eggs, and followed by small quantities of milk by mouth, secured copious bowel movements and recovery. Sedatives were gradually withdrawn, and digestion was reëstablished by rectal feeding.

The Posture and Bearing of the Pregnant Woman.

Kuchnow (*Archiv für Gynäkologie*, Band 35, Heft 3) has found from a careful study of this subject that in the last months of pregnancy the bearing of the woman is of two different types; the most frequent, a backward curve of the entire body; or the posture assumed by twenty per cent. of cases, a

backward bend of the trunk only. The cervical vertebræ are straighter, the thoracic curve is greater and more projecting, the lumbo-dorsal region is straighter, the lumbo-dorsal curve is lower and flatter; the pelvic curve is sometimes lessened in the later months of pregnancy; sometimes unchanged. The hip-joints are usually carried posteriorly. The sternum projects at its lower extremity, the diameter of the thorax being increased.

The Treatment of Placenta Prævia.

Braxton Hicks (*Medical Press*, August 28, 1889) would terminate pregnancy as soon as a diagnosis of placenta prævia is made, remaining with the patient until delivery is over. If the os is dilated and the placenta marginal, rupture the membranes and allow the head to descend; bring it down with forceps if needed. If the os be small and placenta over it, detach the placenta a finger's length around the os; if bleeding cease, wait; if the os does not dilate, use Barnes's bags, followed by forceps or version by combined manipulation. Combined version is indicated in undilated os when forceps and dilators are not available, when free bleeding occurs, when the fœtus is not at term. In general, Hicks has obtained good results from combined version as routine treatment. In common with the English school, he rejects the tampon.

Studies of the Kyphotic Pelvis.

Treub (Leyden, 1889) publishes an atlas with plates, in which he reviews the theories of Freund and Breisky, and adds deductions from his own studies. He denies Freund's theory that the kyphotic is a persistence of the infantile pelvis, and considers it a pelvis resulting from early spinal kyphosis which has prevented development in the normal direction. Breisky's teachings as to muscular action and its results on the pelvis are endorsed. The atlas contains plates from a case of Cæsarean section for kyphotic pelvis, and plates from other specimens.

An Obliquely Contracted Pelvis following Scleroderma.

Torggler (*Centralblatt für Gynäkologie*, No. 35, 1889) reports a case of obliquely contracted pelvis necessitating forceps delivery in a patient aged eighteen years. Five years previously she had had scleroderma of the right lower extremity, in consequence of which atrophy and non-development of the pelvis upon that side followed. The diagonal measurement of the pelvis showed a difference of one-third of an inch; the left hip was higher than the right.

The Technique of Embryotomy.

Thomson (*Deutsche medicinische Wochenschrift*, No. 30, 1889) reports three cases of embryotomy, and compares Braun's decapitation hook and the sickle-shaped knife of Schultz. In the first case reported the fœtus was small, the decapitation hook was easily passed about the neck, and the head was readily severed without injury to the mother. In the two remaining cases the fœtus was large and firmly impacted, the decapitation hook could not be passed

about the neck but slipped over the thorax or shoulder, and it was necessary to use Schultz's knife to sever the tissues, completing it by the hook. The knife must be very sharp to be efficient. Thomson's cases aggregate eleven in which Schultz's knife has been used advantageously. The hook is sufficient in cases where the fœtus is small, but where a large fœtus is firmly impacted the knife decapitates more quickly and easily.

Five Cases of Extra-uterine Pregnancy.

Barsony (*Centralblatt für Gynäkologie*, No. 22, 1889) reports two cases of extra-uterine pregnancy in which the fœtal sac was accessible through the recto-vaginal septum; in one case death from septic peritonitis followed the drainage of the sac; the pregnancy was ovarian. In the other spontaneous expulsion of fœtal bones per rectum was followed by recovery. A case of tubal pregnancy was treated by laparotomy and extirpation of the fœtal sac, with recovery. A case of abdominal pregnancy treated by extirpation of the sac without drainage resulted fatally.

Kézmarsky adds the notes of a medico-legal case seen post-mortem where interstitial pregnancy had ruptured through the posterior wall of the uterus, the opening having been mistaken for one produced in criminal abortion.

A Case of Rupture of the Uterus and a Case of Cæsarean Section.

Lusk (*New York Medical Journal*, September 14, 1889) reports the case of a woman pregnant the second time at term admitted to hospital thirty hours in labor; the previous labor had been instrumental. On examination the cervix was undilated; cicatricial tissue extending from the internal os over the lower uterine segment rendered dilatation impossible. While the patient was in preparation for Cæsarean section she desired to urinate. When placed upon the vessel she strained violently, became suddenly unconscious, collapsed, and died in two hours. On post-mortem examination the uterine rupture extended from the upper portion of the cervix to the right side of the fundus; the uterine wall was about one-third of an inch thick at the rent; the upper portion of the cervix was narrowed to three-fourths of an inch in diameter by dense cicatricial tissue. This contraction was too high upon the uterus to permit discission, Cæsarean section being the only resort.

In the treatment of uterine rupture Lusk advises immediate emptying of the uterus; drainage by iodoform wicking if the rent be incomplete; if complete, laparotomy, closure of the peritoneal covering of the uterus, and drainage, or amputation of the uterus.

He also reports a case of markedly kyphotic pelvis following a fall, with persistent suppuration and sinuses. Delivery was impossible from extreme dislocation of the uterus. Cæsarean section (Sänger) was successfully performed. The patient did well until the fifth day, when rapid pulse, tympanites, fever (103.5°), collapse, and death occurred. No adequate cause of death was found until large psoas abscesses were opened, originating at the carious spine. The combined weight of the lungs was eleven ounces. The child survived. Lusk questions whether uterine amputation would not have saved the patient.

The Causes and Treatment of Rupture of the Uterus.

Piskacek (*Sammlung medicinischer Schriften*, ii., Wien, 1889) contributes an interesting pamphlet to the literature of this subject. In addition to what is commonly known of the causation of uterine rupture the writer has observed that longitudinal rupture is caused by force exerted upon one side of the cervix only, while such force supplemented by a partial turning of the uterus on its axis produces a transverse or stellate rupture.

The prophylactic treatment of this complication consists in placing the patient on that side toward which the presenting part is turned, adjusting the uterus so that its long axis coincides with that of the pelvis, retaining it by pads and bandage, and making pressure upon the abdominal wall at the point where rupture is imminent.

In incomplete rupture of the uterus, with hemorrhage, the vagina should be tamponed with iodoform gauze, and the tampon should be gently inserted, if possible, against the site of the partial rupture. The fundus should be grasped in one hand, and the thumb and fingers of the other should compress the uterine arteries against the pelvis, pressure being also exercised upon the abdominal aorta by this manipulation, which must be continued indefinitely, until hemorrhage is checked.

Complete rupture is most frequent upon the anterior aspect of the cervix and lower uterine segment, the prognosis being least favorable. The most successful treatment for complete rupture is drainage by iodoform wicking, the results being 12 per cent. better than those of laparotomy. When such cases are brought for treatment the child should be at once delivered if still *in utero*, the placenta should be removed manually, as by expression it may be forced into the abdominal cavity. The vagina should be thoroughly douched with thymol, 1 to 2000, or carbolic acid, 2½ per cent., the douche point being accompanied by the finger of the obstetrician to secure the return of the fluid. Iodoform wicking should then be inserted just through the rupture; the vagina tamponed with iodoform gauze, and a binder and compresses placed over the uterus. Should abdominal distention occur, the intestines are thoroughly irrigated and stimulants given. The vaginal tampon is renewed daily, and the douche given. Laparotomy is not commonly indicated, and is most successful when uterine amputation is performed.

A detailed report of 7 cases of rupture of the uterus from Breisky's clinic is given, 4 of which recovered, while 3 died: 5 of the cases were treated by drainage with iodoform wicking, of which 4 recovered. [The pamphlet in question will well repay thorough perusal.—Ed.]

The Causes and Treatment of Post-partum Hemorrhage.

Grenser (*Centralblatt für Gynäkologie*, No. 30, 1889) treated successfully twenty severe cases of hemorrhage after abortion and labor by thoroughly emptying the uterus; bandaging the extremities; keeping the patient horizontal; injecting ether under the skin repeatedly, and also transfusing into the cellular tissue saline solutions.

Leopold, in his clinic, did not remove the placenta for an hour after labor unless hemorrhage occurred. He had found the partial attachment of the placenta to the lower uterine segment a frequent cause of hemorrhage,

the upper portion of the placenta remaining firmly attached, while the lower portion separated from the lower uterine segment which bled freely. The retention of an additional lobe of placenta is also a cause of hemorrhage. In hemorrhage after abortion he dilated the cervix, if necessary; emptied the uterus, and touched the interior with cotton dipped in iron; the injection of iron he considers most dangerous.

The Treatment of Post-partum Hemorrhage.

Misrachi (*Bulletin Général de Thérapeutique*, August 30, 1889) reports several cases of hemorrhage at various periods after labor in which intra-uterine injections failed to arrest the flow. Scraping the endometrium with a straight scraper, the blade of which was corrugated transversely, expelled fragments of placentæ and clots, after which the hemorrhage ceased. A spiral brush was also used to cleanse the endometrium with advantage.

The Treatment of Uterine Colic by Antipyrin.

Misrachi (*Archives de Tocologie*, No. 8, 1889) reports his results in treating uterine colic with antipyrin in fifty-six cases. In doses of from fifteen to thirty grains it was prompt and efficient; hypodermically, seven and a half grains gave good results. After-pains were relieved in this manner, and painful uterine contractions following the use of ergot.

Idiocy following the Use of the Forceps.

Winkler and Ballaan (*Centralblatt für Gynäkologie*, No. 34, 1889) report two autopsies upon idiots in whom cerebral atrophy had followed pressure by the forceps at birth. Examination of the heads of twenty-five living idiots showed in six the marks of pressure on both sides of the cranium. In one autopsy general well-marked cerebral atrophy was found; the indentation in the skull was one-twelfth of an inch deep and an inch wide; the results of compression at this point were very evident in the cerebral tissues beneath.

Obstetric Practice in the Maternity of Lariboisière.

Pinard (*Annales de Gynécologie*, August, 1889) reports his results in 12,580 labors, the total mortality being $\frac{74}{100}$ of 1 per cent., mortality from septic infection $\frac{39}{100}$ of 1 per cent. Antisepsis is practised by 1 to 4000 solution of biniodide of mercury and a saturated watery solution of naphthol. Oakum pads dipped in bichloride of mercury are used to receive the lochia. Lemon juice has been employed in place of silver nitrate to prevent ophthalmia; the cord is dressed by a dry dressing of mercurialized cotton.

The Morbidity and Mortality in Parturition.

Students of obstetrics will find interesting statistics of the morbidity and mortality of parturition in modern times in Ehler's extensive tables of death-rate in Berlin and the German Empire among parturients. The steady diminution in septic and general mortality is strikingly shown, and the advan-

tages of hospital discipline in preventing infection are apparent. Septic mortality is now less than 1 per cent. in a vast average of cases under varying surroundings; general morbidity is 3¼ per cent., and of the patients who suffer disease in childbed 1 in 3.72 perishes. There remain for study and improvement in results nephritis and tubercular infection in pregnant women, and the next decade may show gains resembling the lessening of septic mortality. These tables are published in the *Zeitschrift für Geburtshülfe und Gynäkologie*, Band xvi. Heft 2.

The Treatment of Ophthalmia Neonatorum by Naphthol.

Buscarlet (*Archives de Tocologie*, No. 7, 1889) reports the prophylactic treatment of ophthalmia at the Paris Charité as follows: For the mother, vaginal antiseptic douches during labor, bichloride of mercury 1 : 2000, or β-naphthol 1 : 2500 or 1 : 5000. The child's eyes are touched with solution of silver nitrate 1 : 100 or 1 : 50. For simple purulent ophthalmia the eyes are douched every hour by day, and every two or three hours by night with

β-Naphthol	grs. 6.
Alcohol	℥ 3.
Distilled water	1 quart.

while the eyes are covered with compresses wet in the solution. In gonorrhœal ophthalmia the conjunctivæ are cauterized with silver nitrate solution 1 : 50 or 30 every twelve hours. Naphthol douches are continued, given by a fountain syringe, with compresses.

Encephalocele and Ectopion Cordis caused by Amniotic Adhesion.

Broca (*Annales de Gynécologie*, September, 1889) reports an interesting monstrosity in which a bridle of connective tissue extended from a large parieto-encephalocele to the amnion, and a second similar band connected an ectopic heart with the amnion. Cardiac pulsations persisted for several hours after birth, affording an opportunity for observing the heart's action. The sternum, portion of the skull and of the lower jaw, were lacking. The fœtus was female, and the hymen could be plainly seen to develop from the vagina and not from the vulva. Fully illustrated notes of the dissection are appended.

GYNECOLOGY.

UNDER THE CHARGE OF

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Adhesion of the Omentum to the Symphysis Pubis as an Indication for Laparotomy.

Howitz (*Centralblatt für Gynäkologie*, August 3, 1889) states that he has observed several cases in which he performed laparotomy for the relief of

severe pain attributed to disease of the adnexa, and found adhesions between the omentum and the posterior surface of the symphysis pubis; the pain was entirely relieved by simply detaching the adhesions. The patients were under observation sufficiently long to demonstrate the fact that the relief was permanent.

In one instance he diagnosticated the presence of this condition before opening the abdomen. The patient was thirty-six years of age, and had been married for fifteen years without becoming pregnant. She had suffered from pains in the abdomen since the age of seventeen, and had been treated for ulcer of the stomach, as well as for pelvic trouble; massage, pessaries, etc., had been tried in vain. She vomited incessantly, had become much emaciated, and was never free from abdominal pain. On performing laparotomy the writer found that the uterus was retroflexed and adherent, and that the adnexa were simply congested, but the omentum was adherent to the symphysis, the stomach in consequence being drawn downward, so that its greater curvature was on a level with the anterior superior iliac spine. The adhesions were separated and the abdomen was closed without disturbing the pelvic organs. Four months after the operation the patient remained entirely free from pain.

The writer infers that in many cases the relief from pain experienced is due more to the separation of adhesions than to the removal of the diseased appendages. Since the removal of the tubes and ovaries under these circumstances is often very difficult, it may sometimes be sufficient simply to break down the omental adhesions.

[While we long since expressed the opinion that the presence of peri-uterine adhesions probably accounts for the severe pelvic pain which is invariably ascribed to diseased tubes and ovaries, and that the relief experienced after the removal of the latter might be ascribed to the separation of these adhesions, we do not see why attachment of the omentum alone should give rise to such marked symptoms, which might be confounded with those due to pelvic disease. From inference, as well as from observation, we are inclined to believe that adherent intestines would give rise to more severe pain than would an imprisoned omentum.—ED.]

THE INTRA-PERITONEAL INJECTION OF SALT SOLUTION IN CASES OF SEVERE HEMORRHAGE.

KÜSTNER (*Deutsche med. Wochenschrift*, 1889, No. 17) reports the following case illustrating the necessity of resorting to vigorous treatment in the presence of profuse intra-peritoneal hemorrhage. Laparotomy was performed for the removal of a cancerous growth of the ovary, the operation being difficult and prolonged. Four hours and a half afterward the patient exhibited signs of internal hemorrhage; the wound was reopened and the cavity was found to be full of blood. The pedicle was re-ligated, the abdomen was washed out and the patient's condition at first improved, but she soon grew worse. In three-quarters of an hour she became so weak that thirty-one ounces of saline solution were injected into the median cephalic vein. The pulse, which could not be felt before the injection was given, improved, but the patient again collapsed and became pulseless. The abdominal cavity was re-

opened and forty-seven ounces of the same solution were injected into it. The patient was then comatose, but she soon after revived, the pulse could be felt, and she improved rapidly. After a normal convalescence she was discharged from the hospital on the twenty-second day.

The writer urges that in such desperate cases we ought to reopen the cavity and clean out the blood-clots, even if the hemorrhage has ceased spontaneously, since their presence will expose the patient to the subsequent risk of sepsis. When the patient is pulseless and the blood has almost ceased to circulate, it is idle to resort to intra-venous injections; at least two quarts of saline solution should be injected into the peritoneal cavity, as the peritoneum will absorb it very quickly.

[Although the principle involved in this case is no new one, it confirms in a striking manner the value of irrigation of the peritoneal cavity, which not only secures cleanliness, but also restores to the circulation a certain amount of fluid which has been withdrawn from it. This suggests the propriety of leaving some water in the cavity after irrigation, especially in cases in which there has been profuse hemorrhage, instead of following the usual custom of carefully removing all of it. We have seen no ill effects follow this practice where due antiseptic precautions were observed.—ED]

THE SURGICAL TREATMENT OF TUBERCULOSIS OF THE PERITONEUM.

F. SPAETH (*Deutsche med. Wochenschrift*, 1889, No. 20) has collected sixty-four of these cases in which laparotomy was performed, from the analysis of which he arrives at the following conclusions:

1. In primary tuberculosis of the peritoneum, where none of the viscera are involved, laparotomy is a curative measure. 2. When the pelvic organs are also affected operative interference has not resulted favorably, whether the diseased organs were removed or not. 3. If the disease originates in the intestine operative treatment is simply palliative. 4. When the genital tract is primarily affected the operation should be performed as early as possible. We are rarely able to make a bacteriological diagnosis in these cases. 5. Primary bacillary tuberculosis of the peritoneum is much less frequent than has hitherto been supposed, hence the diagnosis must always be received with caution.

INTERMITTENT HYDRONEPHROSIS.

LANDAU (*Berliner klin. Wochenschrift*, 1888, Nos. 47 and 48) reports four cases in which he discovered a fluctuating tumor in the hypochondrium, which suddenly disappeared and subsequently reappeared. In one instance the diagnosis was confirmed by laparotomy, in the three others by explorative puncture. He attributes the condition to a bend or twist in the ureter, especially when the latter emerges from the renal pelvis at an acute angle. It may be due to abnormal mobility of the kidney.

The symptoms attributed to this condition are rather vague. The patient complains of cardialgia and nausea, sometimes associated with pain over the right lobe of the liver. A variation in the amount of urine voided is noted. Sometimes after an attack of pain in the region mentioned a large quantity of clear, watery urine may be passed. On examination a cystic tumor is felt at

the site of the kidney, the fluid removed from which by the aspirator-needle contains urinary constituents. In some cases the contents of the cyst can be squeezed out into the ureter, and the patient soon after passes a large quantity of urine. The treatment consists in aspirating the cyst and fixing the kidney if it is movable. If the symptoms are urgent a fistula may be established and after the sac has shrunken the ureter may be reopened by the probe, so that the fistula may heal; or the unopened sac may be sutured so high up that the ureter cannot be twisted or bent again.

Manual Emptying of the Bladder.

Heddaeus (*Berliner klin. Wochenschrift*, 1888, No. 43) suggests the following procedure in cases of paralysis of the detrusor urinæ:

The patient being on her back with the thighs flexed, the operator stands on her right side facing her, placing his left hand on the right side of her abdomen, and his right hand on her left side; the tips of the thumbs are opposed, while the fingers make steady pressure over the bladder in a direction downward and backward, so that the fingers are approximated to the thumbs. When the organ is partially emptied the same manœuvre is repeated. Or, the physician may stand with his back to the patient, and placing the ulnar edge of each hand close to Poupart's ligament, may compress the bladder with his thumbs; the latter method is preferable when the organ is partly filled. It may be practised in any case in which catheterization is indicated, except when pregnancy or acute inflammatory troubles are present. It is especially valuable in ischuria following parturition. Great care should be exercised if the bladder is overdistended.

Amyloid Degeneration of an Intra-uterine Polypus.

Stratz (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xvii., Heft 1) reports a unique case of this character. Microscopical examination of a small fibrous polypus removed from the cervical canal showed that its vessel walls had undergone general amyloid degeneration. The patient was in robust health, and exhibited no evidences of visceral disease. A similar condition was noted by Buron in a fibroma of the larynx, but never before in a neoplasm of the genital tract. The cause is entirely unknown. Practically the discovery of such a change in a uterine polypus would suggest the advisability of investigating the abdominal viscera with reference to the possible existence of amyloid disease elsewhere. How far we are justified in feeling alarm on this account is uncertain.

[As the writer says, we so seldom make a careful examination of ordinary polypi that many interesting conditions like the above are doubtless overlooked.—Ed.]

The Manner in which Müller's Ducts open into the Sinus Urogenitalis.

Bierfreund (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Bd. xvii., Heft 1), from the microscopical study of ten embryos, arrives at a somewhat different conclusion from former investigators, *i. e.*, that Müller's ducts divide at their

peripheral ends. In four instances they had separate mouths. The lumen of the duct was seldom patent at its mouth, that is, it seemed to preserve its original solid condition. It seemed rational to infer that in this portion the lumen was originally patent, but that it became obliterated in consequence of hypertrophy and casting off of the epithelial lining, This condition was also observed at the terminal portions of the Wolffian ducts. At the middle of fœtal life it was quite common to find the lowest section of the genital canals blocked by old epithelial cells. In some cases the failure of Müller's ducts to end in the sinus urogenitalis might be ascribed to an individual peculiarity in development. In over one-half of the embryos examined by the writer he found separate openings of the ducts, contrary to Michálcovicz, who states that they always unite before entering the urogenital canal. Probably the former is the more common condition. This communication is established as early as the beginning of the third month of fœtal life.

Cystic Myomata of the Uterus.

Schauta (*Prager Zeitschrift für Heilkunde*, Band x. Heft 2) recognizes five distinct varieties of fibrocysts, viz.: 1. Myxomyomata, resulting from œdematous softening of the interstitial tissue of fibrous tumors, accompanied by proliferation; 2. Soft myomata, in which there is general softening, resulting in the formation of cavities together with atrophy of the muscular fibres, the cavities not being real cysts, since they have no distinct lining membrane; 3. Lymphangiectatic myomata, in which there is general dilatation of the lymphatics; 4. Telangiectatic myomata, containing dilated bloodvessels, but no cavities; 5. A rare form (only one case has been described), in which there are cavities lined with ciliated epithelia.

The writer calls attention to the fact that these tumors are always of the subserous variety, hence their circulation is more easily interrupted, leading to retrograde changes. They are often mistaken for ovarian cysts. Explorative puncture, which is commonly recommended as a diagnostic measure, is dangerous on account of the liability to suppuration of the growth; Fehling reports eleven cases of puncture, ten of which terminated fatally from this cause.

Atrophy of the Uterus and Ovaries.

Kleinwächter (*Zeitschrift für Geburtshülfe u. Gynäkologie*, Band xvii. Heft 1) observed this condition in 1.23 per cent. of his gynecological cases. He believes that it has not the importance which is usually assigned to it, and is often unaccompanied by symptoms. Even when marked the symptoms are only those of chlorosis; in fact, the latter is the primary trouble. Atrophy of the uterus does not necessarily cause amenorrhœa; the patient may menstruate normally, if her ovaries are not affected.

The prognosis of the individual case depends entirely upon the condition of these glands, since, if they are atrophied, menstruation is absent and there is absolute loss of functional activity, causing permanent sterility. An exception to this is offered in the case of inflammatory conditions following parturition, which may lead to temporary atrophy of the ovaries through the pressure of exudates; the same temporary loss of function may result from

wasting diseases. Concentric atrophy occurs more rapidly and reaches a higher grade than excentric. As in many other pelvic affections, it is impossible to reconcile the clinical with the anatomical condition. Since the uterus and ovaries are influenced by many general affections, it is often impossible to say whether the trouble is primary in these organs or not.

Atrophy of the uterus is not rare, but our attention is only called to it when it is sufficiently advanced to give rise to marked symptoms. If patients with wasting diseases were examined with reference to this point, it would frequently be found that the uterus and ovaries had become atrophied.

Slight Cystic Degeneration of the Ovary.

Bulius (*Centralblatt für Gynäkologie*, August 10, 1889) has examined a number of ovaries which presented microscopically a minor degree of cystic degeneration, with the purpose of ascertaining if this condition is really the result of pathological changes, and has come to the conclusion that it is clearly due to various irritating influences, especially to the presence of ovarian and uterine tumors and peritonitis. Anatomically while the follicles are always changed, the stroma is sometimes normal and sometimes not, whence the inference that the follicular degeneration is occasionally primary. The author has examined numerous small cysts, which from their appearance and brownish contents might be supposed to originate from the corpus luteum, and finds from their structure that they are simply dilated follicles into which blood has been effused.

The Internal Crossing of the Ovum.

Schaeffer has an elaborate paper on this subject in the *Zeitschrift für Geburtshülfe u. Gynäkologie*, Bd. xvii. Heft 1, in which he reviews and criticises the four reported cases, all of which he shows to be hypothetical, since there were several sources of error, viz.: It was not positively demonstrated that the body found in the ovary was a true corpus luteum, and that the corresponding tube was occluded at its distal end. The writer arrives at the conclusion that on theoretical as well as on physical grounds it is impossible that the ovum should traverse one tube, enter the uterus, and cross over into the opposite tube, and that up to this time no positive proof exists that this has ever occurred in a single instance.

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